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# THE ESTABLISHMENT OF CEREBRAL HERNIA AS A DECOMPRESSIVE MEASURE FOR INACCESSIBLE BRAIN TUMORS; WITH THE DESCRIPTION OF INTERMUSCULAR METHODS OF MAKING THE BONE DEFECT IN TEMPORAL AND OCCIPITAL REGIONS

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THE diagnosis of an intracranial growth is usually simple; the recognition of its situation is as likely to be puzzling. It may be stated that by far the greater number of cases, with our present knowledge, cannot be localized: that of those whose seat can be approximately told, but few prove to be surgically accessible: that of those which are accessible, only a very small proportion can be completely removed and in such a way as to leave the patient free from paralysis and with mental powers unimpaired. Needless to say, when a tumor can be localized with reasonable certainty, and is at the same time in an approachable situation, the surgical indications are clear,—it should be eneucleated, preferably through an osteoplastic opening with subsequent restoration of the cranial covering. On the other hand, if we are to regard mitigation of symptoms alone as a therapeutic desideratum, inaccessibility or ignorance of position offers no barrier to palliative measures; and here we are called upon to establish a bone defect through which the brain may protrude. Though a subject which has received the attention of several writers, notably of Horsley, and of Sänger, the Hamburg neurologist, it nevertheless is one which still remains much misunderstood.

The experience gained through the many ineffectual efforts to remove or even to find tumors known to be present, has taught us that the operation may be expected to alleviate the underlying symptoms occasioned by the pressure effects of the growth. Leaving aside for the time being all questions as to the location of the tumor, these general, underlying symptoms — the headache, the vomiting, and the choked disc — are almost invariably present, though they may differ considerably from case to case in their time of onset, intensity, or persistence. As a rule, however, they are so characteristic, so beyond the reach of medicaments, so distressing to friends and physician as well as to the patient, that there is little occasion for surprise at the frequency with which one encounters this symptom complex in the pages of modern fiction.

Intracranial pain in some form or other is rarely absent; it may be insufferable. Rapid loss of strength and weight may follow the vom-

iting, and this more than any other factor confines the patient to his bed, as it is a symptom aggravated by the erect posture. Finally, blindness is perhaps even more dreaded than its companion symptoms, for in many cases, particularly in subtentorial growths, optic atrophy may be an early consequence of the stasis papilla, and be present long before the growth seriously dulls the faculties or proves fatal by invasion of vital centers.

Bearing little or no distinct relation to the nature of the process, and oftentimes none to its situation or size, these symptoms are purely a consequence of the increased cerebral tension brought about by the foreign body, the "Raumbeschränkende Herd" of the Germans. The first effect of the encroachment of a growth on the intracranial space is to cause there a general venous stasis, a condition which is greatly accentuated by a process so situated as to interfere in any way with the outflow of cerebrospinal fluid from the ventricles. And it is probably this obstruction to the normal venous circulation that leads sooner or later to œdematous swelling of the optic papilla, for the final round-celled infiltration and atrophy are not the result of an inflammatory process, as the term optic neuritis would indicate. On two occasions I have known a choked disc to completely subside a few hours after a palliative operation; in one of these patients a swelling of seven diopters was perfectly flat three hours after the primary bone opening was made as the first stage of a suboccipital exploration for a cerebellar tumor.[1]

The morbid physiology of the headache and vomiting is less easily explained, certain though it is that these symptoms likewise are a consequence of the increased intracranial pressure. It is a personal belief, acquired through the observation of patients after extirpation of the Gasserian ganglion, that the headaches — and possibly all varieties of headache — are dural in origin, and that they arise in cases of brain tumor from stretching of the trigeminal filaments that sensitize this membrane and its expansions forming the falx and tentorium; for the brain itself and its pia-arachnoid are devoid of common sensation, just as are the abdominal and thoracic viscera together with their enveloping serosa, only the parietal covering of their cavities possessing sensory nerves, as the observations of Lennander have so clearly shown in the case of the abdomen. The cause of the vomiting is less clear. Whether or not there is a separate center in the medulla, irritation of which leads to emptying of the stomach, as some have claimed; whether it results from stimulation of the vagus center itself, an unlikely conjecture, as there may be no associated slowing of the pulse; or whether it is in some way associated with the dizziness and is due to auditory nerve disturbances, possibly secondary to venous stasis,—I will not attempt to decide.[1]

On whatever physiological grounds we may account for these individual phenomena, the fact remains undisputed that they are, remotely at all events, due to the pressure effects of a slowly enlarging foreign body, and being so, it should be possible to relieve them by allowing the compressed brain to protrude through an artificial opening in the skull; in other words, by decompressing it. This has been found to be the case. Did the skull remain throughout life as it is in infancy, a partially membranous

[1] It is remarkable, how sensitive are the unsupported retinal veins to even a slight degree of venous stasis. Any obstruction to the return flow of blood from these vessels, whether it be intracranial or cervical in site, will cause their dilatation and increase their tortuosity. I once, while Dr. Bordley watched the fundus of one eye, slowly inflated a Riva-Rocci blood-pressure apparatus, the armlet of which had been placed about the neck. When a pressure of about 36 mm. of mercury had been reached, the veins had become perceptibly dilated, and they increased in size and tortuosity corresponding with an increase of the pressure until the latter became so disagreeable as to lead to symptoms of faintness and nausea. On another occasion he watched the fundus of a patient's eye during the tapping of the lateral ventricle; it was a case of internal obstructive hydrocephalus due to a bilar meningitis, in which a small trephine opening had been made for purposes of ventricular aspiration. With intervals of a few days, and as the patient's symptoms of stupor and headache demanded, the ventricle was tapped several times, and as no anæsthesia was used, except on the first occasion, and as the patient could be put in the erect posture, the conditions were most favorable for an ophthalmoscopic examination. Fluid under considerable tension was always removed, and the moment it spurted from the needle, the dilated veins of the fundus were seen to shrink in size and to lose their tortuosity, and in the course of a few hours, the œdema of the disc had disappeared.

[1] These three fundamental symptoms are of course not always present. A slowly invading growth may infiltrate and destroy the brain substance as it advances, and possibly give localizing symptoms without any evidence of the usual underlying pressure phenomena; indeed, patients may die with a brain tumor that has given no characteristic symptoms whatever. Again, a small dural growth, originating, for example, at the base, may give headaches out of all proportion to any other symptom, perhaps with no vomiting or ocular changes. Then, optic atrophy and blindness may result from a small growth near the optic chiasm without any general pressure symptoms. But it is with the generality of cases rather than the exception that this paper deals.

On the other hand, after a decompressive operation, even when the bone defect has been sufficiently large to lead to a subsidence of the choked disc, and to completely relieve the headaches, I have on two occasions been troubled by a continuance of the vomiting. From a patient now under observation, a frontal lobe tumor was removed six months ago, a large opening in the skull having been left. Though relieved in all other respects, he is still distressed by vomiting, which occurs whenever he assumes an erect posture. Another patient, a small boy with a decompressive craniectomy in the suboccipital region, throws up an ounce or two of watery mucus every morning on first awakening, but this has interfered in no way with his nutritional condition, nor with his physical activity during the day. These cases, likewise, are the exception to the rule, for the decompression usually relieves all three of the underlying symptoms.

and distensible covering for the brain, there would be no occasion for palliative operations; but when the separate parts of the cranial vault have become fused, the mechanical conditions are vastly different. Nevertheless, even then, decompression for a brain tumor may be brought about by natural (in contradistinction to operative) processes. Some striking examples of this kind have come under my observation.

Several months ago, I saw, in consultation, a young woman, 24 years of age, who from her history and symptoms, had been suffering from a brain tumor for almost six years. Intense headache, with frequent, almost daily, attacks of vomiting, lasted over a period of two years, and emaciation had become extreme. During this period there had been no localizing symptoms whatsoever. A pulsating swelling then developed under the muscle in the right temporal region, after which the headaches and vomiting gradually and completely subsided, and she lived in comparative comfort in this condition for four years longer. Until a few months before her death, her intellectual faculties were apparently unimpaired. Unfortunately, she had become blind long before the tumor growth made its way through the skull, with consequent relief to the pressure phenomena. At the autopsy, a tumor nearly the size of a tennis-ball was found completely filling the middle cerebral fossa on the right side. The growth had originated in the meninges over the tip of the temporal lobe, and by slow-pressure absorption an opening about 5 cm. in diameter had been made in the overlying wing of the sphenoid and squamous portion of the temporal.

In younger individuals, decompression may occur through separation of the already fused sutures, and though I do not remember to have seen this fact commented upon, three instances of the condition have come under my observation.

A boy, five years of age, began, in June, 1904, to suffer from frontal headaches, to have long periods of drowsiness and frequent attacks of projectile vomiting. Two months later he began to lose the use of his left foot and leg, then of his shoulder, and finally of his arm. The paralysis of each member was preceded by irritative movements, though there had been no convulsions. There was divergent strabismus and total blindness. He had an unusually large head, and percussion over the vault gave a peculiar "hollow-cask" note, such as may occasionally be elicited in cases of meridional fracture of the skull. Separation of the bones was not detected on palpation. The boy's parents were aware of the enlargement of the head, and had themselves observed that an abatement of the symptoms had occurred at about the time it was first noticed. For the following month, and up to the time of admission to the hospital, there had been no vomiting and no complaint of headache.

An operation was performed November 9, 1904, and an enormous non-infiltrating tumor (a fibroma weighing 300 grams) was removed. It occupied almost the entire posterior half of the right hemisphere. The patient survived the operation only a few hours. At autopsy the sutures of the cranial vault were all found to be separated from one another for a distance of one half to one cm.

The other two cases are similar. One of them, a girl of eight, had suffered from symptoms of tumor for only eight months. On examination, she presented the classical localizing signs of a tumor of the right cerebellar lobe. She had become blind. Percussion of the head elicited the same "hollow-cask" note as in the case just mentioned, but here it was possible to detect the separated sutures by palpation through the scalp. Even the separation of the parietal from the temporal bones could be made out. The history related the fact that for almost two months she had been free from headaches and vomiting and her general condition had greatly improved. As an operation offered no prospect of any further alleviation in her symptoms and could only prolong a miserable, blind existence, the parents wisely decided against it. In the third of these cases, a palpable separation of the sutures was present in a child of four. The same peculiar note was brought out on percussion. The child had a subsiding choked disc with atrophy, and for several weeks had been free from headaches and vomiting, — probably since the time of this natural decompression. There were no definite localizing symptoms, though the growth was presumed to be in the midbrain. There were consequently no indications for surgical intervention.

It would be a mechanically ideal treatment for cases of inaccessible tumor if in adult life it were possible for us in some way to bring about such a dislocation of the sutures in the cranial vault. As we cannot do so, recourse must be had to decompressive methods which are less perfect, inasmuch as they do not so evenly distribute the decompression.

Lightly as they have been treated by writers on surgical measures, palliative operations are not simple performances, nor ones to be undertaken without mature forethought; else, far from palliating, they may only serve to aggravate pre-existing

conditions, a mishap which must have occurred to others in this field of work besides myself. Of course if one has any reasonable idea of location, and a tumor promises to be accessible, the operation must be undertaken with the primary view of removal, but under all other circumstances, the site of the proposed craniectomy must be most guardedly chosen.

I have said that the explorations, as formerly conducted, often sufficed to relieve symptoms in a most unexpected way. Nevertheless, they were as likely to be followed by the lamentable consequences of a hernia, tense enough to break down a badly placed or carelessly closed wound; and so they often led to a fungus cerebri, which, in case of tumor, almost invariably means meningitis and early death. The mere removal of bone alone does not usually answer as a palliative measure, for, owing to the inelasticity of the dura, sufficient decompression will not ensue until this membrane has been freely incised or removed. Then, too, if in consequence of the growth there is any considerable increase in cerebral tension, the brain will bulge to such an extent through the cerebral opening that resuture of the membrane, even were it desirable, is almost an impossibility. Indeed, in such cases, particularly after explorations conducted with the osteoplastic method, even the reposition of the bone flap may be impossible, without putting such a degree of tension on the sutures in the scalp that a subsequent break down is probable. There is a curious reluctance on the part of many surgeons to leave bone defects in the skull under these or any other circumstances, and many unnecessary devices for covering them in have been described and advocated. Emphasis must be laid on the fact, however, that in cases of brain tumor the defect is desirable; also, that the cerebral protrusion acts as a safety-valve, so to speak, for the compressed brain, and being the object of the operation, is not a thing to be combatted, but rather one to be controlled.

From its position alone a hernia may often lead to serious and distressing consequences through resultant paralyses. It is the almost inevitable result of a protrusion of considerable degree, that, from compression and œdema, the function is in large part strangulated out of that part of the cortex which covers the bulging mass. Hence, if the exploration has been made over the motor area—and, owing to accessibility and ease of localization, a large number of our operations for tumor are apt to be there—an exaggeration of pre-existing symptoms of paralysis, or indeed paralyses which were non-existent, may be an immediate consequence of the operation. There are two ends that we should seek to accomplish: one to establish the hernia over as "silent" or unimportant an area of the cortex as possible; the other to avoid an unnecessarily large protrusion. Needless to say, a small trephine opening is totally insufficient; a large defect must be made, all things being equal, the larger the better. Inasmuch, also, as the degree of cerebral tension resulting from local processes is greatest in their immediate vicinity, (except when the growth has led to internal hydrocephalus or to some other secondary process) diminishing inversely with the distance from the growth, it is supposedly preferable to make the defect in the cranial vault in case of growths of the hemisphere and in the suboccipital region in case of a subtentorial tumor.

Before describing the particular operations which seem to me at the present time to be the safest and most serviceable for the generality of cases, it may be as well to bring out the points which I wish particularly to emphasize by citing a few specific examples from among the fifteen cases of palliative operations which I have been called upon to perform during the past few years. Surgical knowledge of value is built up more on the mistakes than on the successes of past experience.

Karl L., an intelligent German machinist, 32 years of age, was admitted to the hospital, in Dr. Osler's service, on September 2, 1903. Beyond the fact that he had received a severe blow on the head eleven years before, his history was without bearing on his present condition. Following this injury, however, he had suffered from periodical spells of vertigo and "lapses of power to follow a connected train of thought." These attacks were transitory, and though of frequent occurrence, they did not keep him from work.

In the summer of 1901, he began having severe headaches; they have since increased in frequency and intensity. In May, 1903, these periods of intracranial pain began to be accompanied by nausea and vomiting. He noticed at about the same time that the vision in the left eye was failing, and that he had difficulty in seeing objects on his right side. He has kept at work until the week before entering the hospital.

The frequent notes upon his condition, made by many

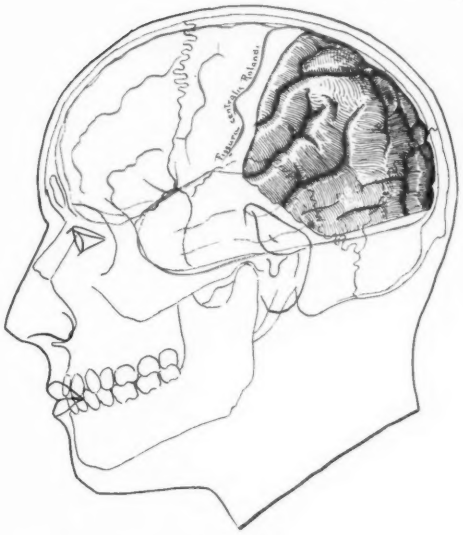



FIGURE 1.—Case; Karl L. Shaded area shows extent of exposed hemisphere which subsequently herniated into the bone defect. Opening entirely posterior to the "motor cortex." Lateral view.

observers during his hospital residence, are too voluminous to relate in full; the bare essentials will be given.

On his admission an advanced degree of choked disc was found present in the left eye, with subacute vision and a contracted field. The right eye showed at first merely a hyperæmic disc, but during the succeeding weeks, the optic papilla on this side became as acutely œdematous as the other.

From the first, there was almost total right homonymous hemianopsia. There were no palsies of the ocular muscles; no diplopia. Nystagmus was occasionally noted, though it was not a constant symptom, nor did it bear any relation to the position of the globes. The pupils were occasionally unequal, the left larger than the right. A double otitis media of long standing made auditory tests unsatisfactory. Hearing was better in the right ear.

The headaches were at times intense, and almost always associated with mental dullness and with sudden projectile vomiting, unaccompanied by nausea. They were usually located in the posterior cranial region and always said to be worse on the left side. There were some days when he was quite free from pain. The left side of the head posteriorly was invariably tender on percussion, more so on his "bad days." He was practically bedridden.

There was almost always to be observed a slight assymmetry of the expressional muscles with weakness of those on the right side. Occasionally, there was slight weakness in the right arm, and he had at these times a subjective sensation of numbness there. The deep reflexes of knee and ankle were present, almost invariably more active on the left than on the right side. Skin reflexes were everywhere normal. There was some ataxia, with a constant tendency to sway toward the left. Occasionally there was a little incoordination in the movement of the right arm. An inclination to yawn was noted by all observers.

For a month after admission, the patient was given faithful antisyphilitic treatment, during the course of which his general condition progressively became worse. Rarely a day passed without a prostrating headache. The left optic nerve began to show signs of atrophy and there were numerous fresh hemorrhages in each retina. There were occasional periods of involuntary micturition. It was noted during the few days before his operation that there was a slight hypæsthesia to all forms of sensation on the right half of the body. The patient's mental processes seemed in no way affected. There was no form of aphasia present. His pulse was usually slowed.

The blindness of the left half of each retina, the indications of sensory disturbance on the right side of the body, the early choking of the left disc, and the tenderness over the left part of the cranium posteriorly, made it seem probable that the lesion was a deep-seated, left-sided growth in the posterior part of the hemisphere, and perhaps compressing in slight degree the sensory tracts converging toward the internal capsule.

For these reasons an exploratory craniectomy, with an opening posterior to the left Rolandic fissure, was under taken, in the vain hope that a growth might be found.

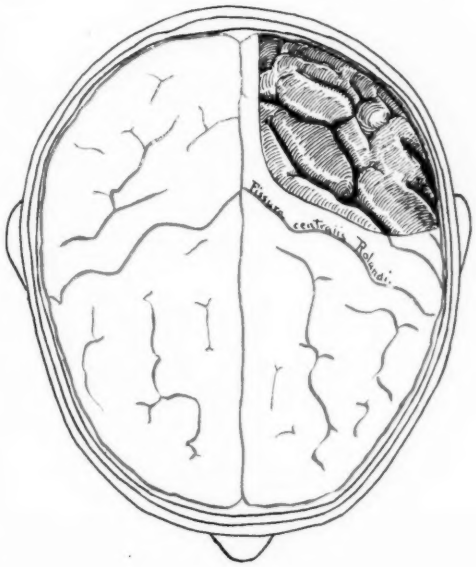



FIGURE 2.—Case; Karl L. Same as Fig. 1. Superior view.

The procedure was conducted with the expectation that should no growth be found, the bone would not be replaced. This would mean a hernia, with loss of function of the herniated cortex, and it was desirable that no portion of the precentral convolution should thus become involved.

*Operation.* October 8, 1903.

A cranial tourniquet was applied and after elevating a large bone flap, measuring 11 by 9½ cm., the dura was reflected so as to expose the outer surface of the post-central half of the left hemisphere. The area is shown in Figs. 1 and 2. The precentral gyrus was not included in the opening, as faradization of the exposed convolutions nowhere gave any motor responses, except for movements of the eyes when the occipital pole was stimulated. The brain, under great tension, bulged markedly through the dural opening. The situation of the growth was not determined.

And this is the lesson which the case draws. A hernia protected only by the overlying scalp is capable of such a degree of protrusion, that the tracts radiating from the cortex must be ruptured and their function lost, even if the œdema should not suffice to interrupt their activity. An intermuscular temporal operation in this case, as in the one to be described below, would probably have left the patient without his disabling asteriognosis, and so, capable of working, and at the same time able to amuse himself with reading, a resource from which he was entirely cut off.

With an increasing hernia (Figs. 4, 5, 6, and 7) he kept well and free from discomfort during the following year. The great size of the hernia finally induced us to readmit him to the hospital. Judging from a previous experience, it was concluded that the protrusion was in part due to a complicating internal hydrocephalus, and under the belief that we had to do with a tumor com-

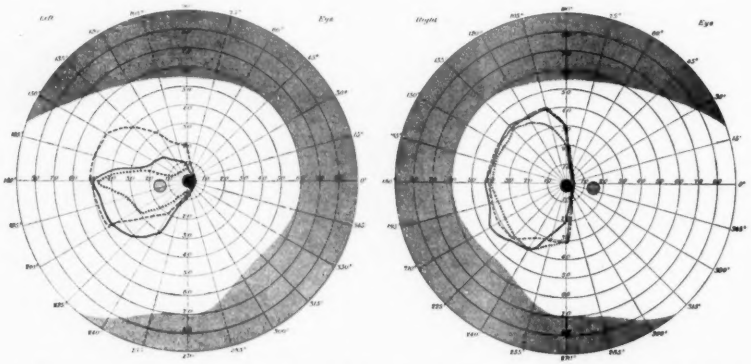


FIGURE 3. — Case; Karl L. Visual fields greatly contracted, especially the left, from atrophy after subsidence of choked discs and with total right hemianopsia from lesion of the optic radiation. Solid line, blue; dotted line, red; broken line, yellow.

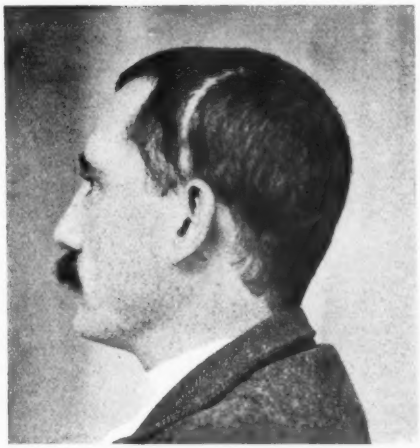
After stripping away the bony layer of the osteoplastic flap and replacing the scalp and periosteum alone over the denuded brain, the edges of the incision were accurately approximated by interrupted sutures and the dressing partly applied before the tourniquet was removed. The wound healed per primam.

The operation accomplished in a decompressive way all that was expected from it. The headaches were immediately relieved. There was no more vomiting, and the patient began progressively to gain in weight, so that in three months he weighed 167½ pounds, a gain of 30 pounds. The choked disc subsided rapidly, leaving him, however, (compare charts, Fig. 3,) with greatly contracted visual fields, more particularly in the left eye. As an offset to this complete alleviation of the underlying pressure symptoms, the physiological activity in the protruding part of the brain was lost, so that immediately following the operation there was complete visual word-blindness and complete loss of stereognostic sense in the right hand, with greatly increased hypæsthesia of the entire right side of the body.

pressing the aqueduct of Sylvius, it was determined to explore the hernia itself, in the hope of readjusting the cerebro-spinal circulation. We were further deluded into believing that it was an obstructing hydrocephalus by the fact that an exploratory puncture, which must have tapped a local collection of fluid, led to the withdrawal from the protrusion of about 30 c.c. of cerebro-spinal fluid.

On November 10, 1904, a second operation was done, and abandoned as hopeless, since we failed to enter the lateral ventricle. As a result of this operation a fungus cerebri resulted, and death three weeks later from the usual consequent meningeal infection.

By carotid injections, the brain was hardened in situ before removal and then cut in serial sections, one of which, just posterior to the corpus callosum, passed through the center of a large encapsulated growth, histologically a neuroglioma, whose base lay upon the tentorium and whose bulk occupied in large part the entire site of the occipital lobe. The accompanying sketch (Fig. 8), made from this particular section,



FIGURES 4 and 5.—Case; Karl L. Size and condition of the hernia a month after the operation.

shows the relation borne by the tumor to the overlying hernia.

From a purely palliative standpoint the result of the operation in this particular case could not have been more gratifying. Only too obvious,

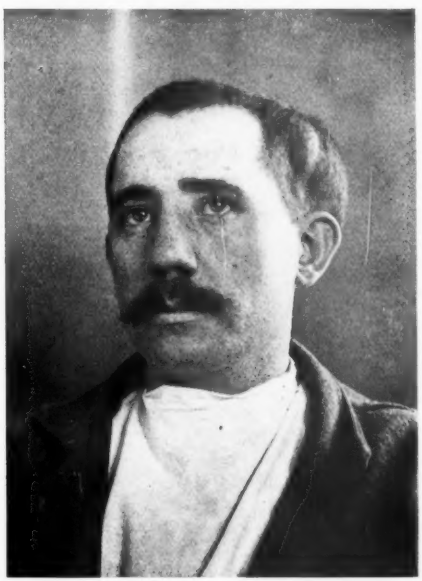
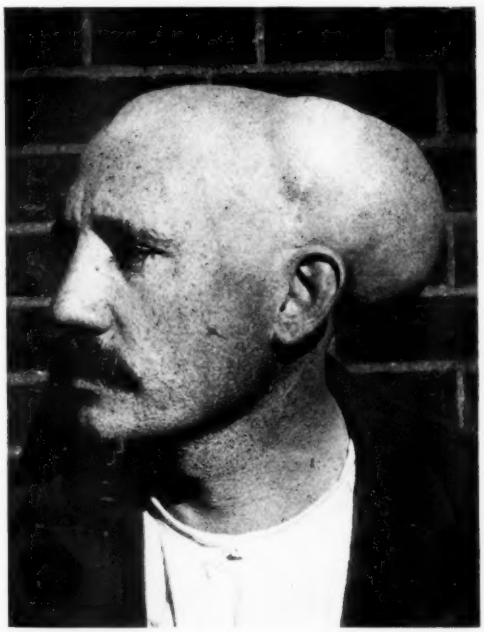


FIGURE 5.

however, are the disadvantages which arose from the establishment of a large hernia on the left side of the head in a right-handed person, even though the protrusion was confined to the post-Rolandic or purely sensory areas. A corresponding craniectomy on the opposite side, had the symptoms led to an exploration there, would have exposed a more silent area, and it is for this reason that Sänger regards the right



FIGURES 6 and 7.—Case; Karl L. Size and condition of the hernia on his readmission to the hospital a year after the first operation.

side of the head posteriorly as the seat of election for palliative operations. The following history, however, recounts even more serious sequels, which followed upon a right-sided posterior decompression in a case which unhappily was complicated by an internal hydrocephalus.

Mrs. E. P., 24 years of age, soon after the birth of her second child, September, 1903, began having symptoms indicative of intracranial trouble; dizziness, drowsiness, and "splitting" headaches, accompanied by frequent vomiting. Two months later, when she entered Dr. Osler's ward in the hospital, there was some dimness

of vision, and an ophthalmological examination revealed a double "neuro-retinitis hæmorrhagica" of advanced degree. Although the urinary examination was negative, it was insisted by the ophthalmologists who saw her that the changes in the fundus were those peculiar to albuminuric retinitis. The case was regarded, however, by Dr. Thomas and myself as one of probable tumor. There were no localizing symptoms to indicate the seat of trouble beyond the fact of an occasional complaint that her left hand "felt queer." There were no sensory disturbances to be made out by the usual tests; no changes in the reflexes. She was dull, and at times stuporous. A lumbar puncture was performed, showing an abundance of fluid under increased tension. The withdrawal of 15 c.c. left her with a profound headache which lasted without interruption for forty-eight hours.[1]

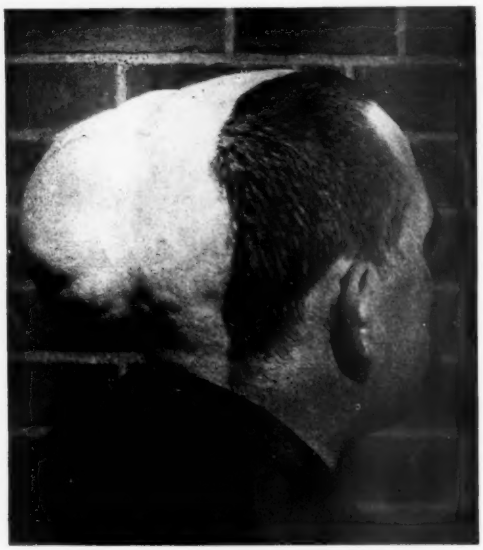


FIGURE 7.

She was kept under observation for two months and given antisyphilitic treatment with no apparent benefit. Early in January, she had a severe general convulsion.

*Operation.* On January 6, 1904, a decompressive craniectomy over the right posterior aspect of the brain was carried out. The patient improved markedly for a time after this operation, but the hernia left her with left homonymous hemianopsia, with complete loss of muscle sense on the left side of the body, as well as with a diminished acuity to other forms of sensation. Owing to the loss of muscle sense, she was to all intents and purposes paralyzed on this side.

An enormous hernia slowly developed, becoming finally almost as large as the remainder of the head itself. On February 19, it measured 42 cm. in circumference; on March 21, 49.5 cm., on which day it was elevated about 14 cm. above the level of the head. The protrusion was translucent, evidently due to the ventricular dilatation secondary to an obstructive hydrocephalus. The hernia was aspirated four times, and 550, 680, 450, and 480 c.c. were removed on the various occasions. After each aspiration the patient would immediately brighten up, but it would require only about 24 hours for the sac to refill as tightly as ever, when her stuporous condition would return. She died on the 27th of March, 1905.

The autopsy disclosed a tumor (sarcoma) involving primarily the right optic-thalamus. It had obstructed the aqueduct of Sylvius, leading to great dilatation of the third and lateral ventricles, the foramina of Munro being large enough to admit the index finger. The left lateral ventricle contained about 200 c.c. of fluid and the right about a liter. The entire posterior half of the right hemisphere as far forward as the posterior central convolution was thinned out to a mere shell lining the hernial sac.

Such a degree of obstructive hydrocephalus as was present in this patient offers the most unfavorable of conditions for palliative operations carried out by ordinary methods. The case, however, is cited for the reason that it shows how enormous a hernia may become without breaking down and fungating, even though it be only covered by the scalp and protected by a recent scar. It shows, too, how beneficial it would be to have some natural protection against the formation of such a large protrusion.

[1] Much discussion was occasioned by this case, owing to the character of the retinal changes, which were long presumed to be due to renal disease, even though the urinary examination was negative on repeated observations. I have seen so many instances of this mistake that I have come to believe that the same causes must underlie the choked disc of tumor and the so-called retinitis associated with renal disease. It seems not improbable that an increase of intracranial tension due to cerebral œdema may be responsible for the occasional retinal changes in Bright's disease, as well as for the headache and vomiting which may characterize it. Thus, the mechanical conditions leading up to these symptoms in the two widely different maladies may be closely akin. I have twice seen patients admitted to the hospital with a diagnosis of tumor which subsequent examination, ultimately confirmed at autopsy, showed to be instances of renal disease; and cases of nephritis diagnosed as tumor are still more common.

It is possible that the withdrawal of fluid by lumbar puncture in these conditions of presumable cerebral œdema might greatly alleviate the symptoms of intracranial pressure that characterize some cases of nephritis; and the recent favorable reports of the benefits of lumbar puncture in uræmic convulsions might make this view more probable. On the other hand, lumbar puncture and the withdrawal of fluid in cases of undoubted tumor cannot be too seriously condemned. There have been many fatal cases reported, to which I may add another that came to my knowledge three years ago: A patient with a cerebellar cyst, who died a few hours after the withdrawal of about ten cubic centimeters of fluid, removed for diagnostic purposes from the lumbar region. When one realizes the extent to which the bulb and lower cerebellar margin are crowded down into the foramen magnum by an intracranial growth it, can be easily understood that the removal of the supporting fluid from the spinal canal may lead to serious risk of pressure injury to the important centers of the medulla. A puncture, however, for the sole purpose of measuring the tension of the fluid by means of a manometer can be made without particular risk, since only the fraction of a cubic centimeter is needed for this purpose, provided the apparatus is properly constructed. The knowledge thus gained may be of diagnostic value but no more fluid than is necessary for this measurement can be safely withdrawn.

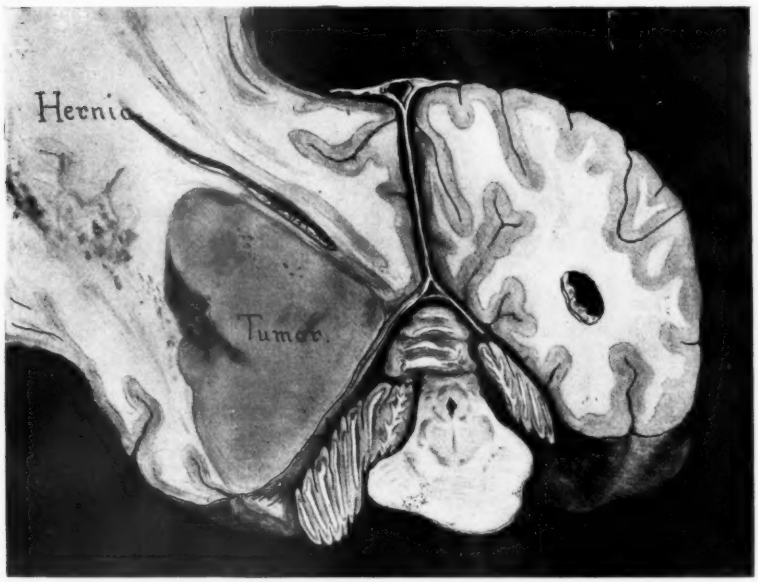



FIGURE 8. — Case; Karl L. Drawing of a section of the brain, which passed nearly through the center of the tumor mass. Note the deflection of the anatomical structures toward the hernia; the ventricle, for example.

It was from a desire to control the growth of these formidable herniæ, that the plan was hit upon of making the bone defect under the temporal muscle, and subsequent experience in several cases has made it seem probable that the procedure represents a considerable advance in our methods of dealing with these critical conditions. The advantages are many. An oval opening may easily be made, about 5 or 6 by 8 or 10 cm. in its two diameters, without freeing the muscular insertion at the temporal ridge. Being in a comparatively thin and relatively non-vascular portion of the skull, the bone is easily rongeured away, and the opening on one side alone is usually sufficient for decompressive purposes. Should it prove not to be, a bilateral operation of the same kind may be made. The denuded area of the cortex exposes, for the most part, the convolutions below the fissure of Sylvius, including only the very lowest part of the motor strip (Figs. 11 and 14), so that, even in cases of extreme unilateral bulging, the greatest harm that would ensue would be from an implication of the center for the tongue, jaw, and lower part of the face on the one side. The incision is entirely within the hair margin, and the degree of protrusion that may take place under the protection of the muscle may not be at all obtrusive.

I have carried out the procedure six times for unlocalized growths, and for illustration one or two of the cases will be cited in detail. The first of these, a case in which an autopsy has been obtained, proves to have been a crucial one for any method, owing not only to the size, but to the situation of the growth, for, as in the case of Mrs. E. P., above cited, it had caused an internal hydrocephalus.

The patient, Roy L., a civil engineer, 28 years of age, entered the hospital October 23, 1924, complaining of persistent headache. He had been under the care of Dr. Frank R. Smith, who had made the diagnosis of tumor. The onset of the trouble was attributed to the shocks from the frequent use of dynamite which his professional work demanded. In addition to the headaches, it was found on questioning, that for three months he had been vomiting almost every morning, and that for several weeks his vision had been failing. He had lost much weight. He had experienced of late considerable difficulty in walking.

On examination, a double-choked disc of high grade — nine diopters — was found, with many retinal hemorrhages. As is usual in cases of intracranial growth, there was considerable cyanosis of the face, and the dilated venules of the eyelids, and those converging at the canthi of the eyes, as well as the larger veins over the forehead and scalp, were considerably dilated. His gait was very unsteady, and he usually — particularly on his bad days — had to be supported when walking, owing to a tendency to fall backward. His mental state was normal, other than for a proclivity to weep. He would often burst into tears, with no apparent provocation.

we assured of the obstructive hydrocephalus. The wound was closed without drainage and healed by primary union.

The patient recovered well from the operation. He had no further headaches or vomiting, and rapidly regained his lost flesh. A fairly large, though not an obtrusive, hernia developed on the right side — mainly that from which the dura had been removed. The choked discs gradually subsided. As a result of the hernia (cf. photograph of brain showing its exact situation, Fig. 11), there was a slight deafness in the right ear, some weakness of movement of the left half of the

FIGURE 9. — Case; Roy L. A patient with obstructive hydrocephalus from mesially placed tumor. Showing protrusion under temporal muscle after intermuscular operation.

Physical examination was for the most part negative. There were no cranial nerve palsies; no motor or sensory disturbances of the spinal fields. The reflexes were all normal.

An energetic though brief antiluetic régime was followed by no abatement of the symptoms. The severe headaches and the vomiting continued. There was no particular change observable in the eye grounds.

On September 2, 1904, a bilateral palliative operation was performed under ether anæsthesia. A bone defect measuring about 5 by 7 cm. was made under each temporal muscle. The dura was opened and cut away on the right side alone, for I was somewhat fearful of producing total deafness (word-deafness) or paralysis of the tongue from a symmetrically bilateral cortical lesion which would result from the double protrusion. The ventricle was not aspirated, contrary to the usual rule, so that not until the autopsy in the following year were

tongue, and also a trace of weakness in the muscles of the lower left side of the face. For two months the patient improved greatly in his general condition. He returned to his home, was able to be about, gained considerably in weight and strength, and remained free from his former subjective discomforts. To our great distress, and despite the apparent subsidence of the choked disc, he gradually lost his vision, a condition for which we could not account until the autopsy. The optic nerves did not give the usual picture of post-neuritic atrophy. The blindness, with an increase in unsteadiness when upright, kept him in bed from this time on. Then came periods of dullness and stupor, from which he could be aroused sufficiently to answer questions, only to lapse again into the same somnolent condition, alternating with days when he was bright and mentally active. The hernia was always more tense on the bad days, and this he himself appreciated. He

FIGURE 10.—Case; Roy L. Mid-longitudinal section of brain and tumor. Growth presumably originated from the corpora quadrigemina. Note dilatation of third ventricle and dislocation of cerebellum and splenium of corpus colossum.

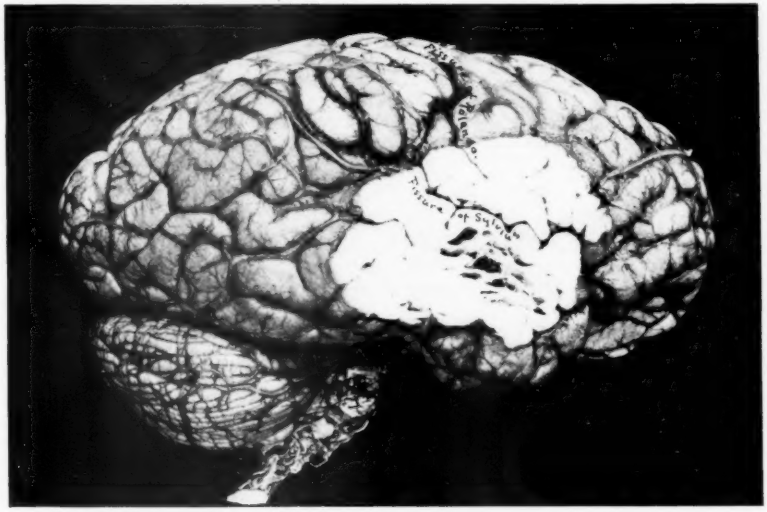


FIGURE 11.—Case; Roy L. Photograph of right half of brain after shaving away the herniated portion of the hemisphere in order to show the extent of cortex involved in the protrusion through the intermusculo-temporal defect. Note the openings on the cut surface, which presumably represent channels of outlet for the obstructed cerebrospinal fluid.

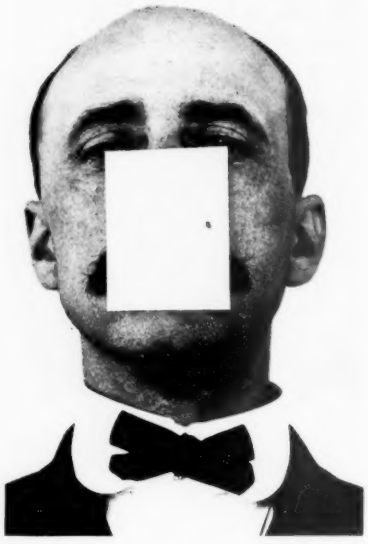


FIGURE 12.—Patient two years after an intermusculo-temporal operation, with complete alleviation of symptoms during this interval. To show the comparatively slight and unobtrusive extent of the hernia.

gradually lost his hearing, became stone deaf, and finally, for the terminal three months, lapsed into a passive state, like a decerebrate animal, whose bulbo-spinal axis alone remained normally active. His nutritional state kept at the best until the end. The photograph (Fig. 9) shows the condition of the hernia a short time before his death, the head having been partly shaved to expose the protrusion.

No further localizing symptoms were made out at any time beyond the unsteadiness of gait, (there was no ataxia whatsoever, but merely a tendency to fall back ward), the blindness, and the deafness, both of which, being absolute, were supposed to be associated in some way with the general tension rather than to be indicative of the seat of trouble. It was conjectured that an obstructive internal hydrocephalus was the cause of the stupor and dullness.

The patient died June 15, 1905, after two days of an acute pneumonia, possibly of inhalation origin.

At the autopsy, performed by Dr. Macallum, a soft vascular tumor was found, symmetrically involving the dorsal part of the brain stem. It was about the size of a hen's egg, embraced the region of the corpora quadrigemina, and had invaded equally on each side the regions of the geniculate bodies, thus accounting for his visual and auditory symptoms. A mesial section of the brain and tumor is shown in Fig. 10. The growth was a gliosarcoma of rather unusual character. It had obstructed the aqueduct of Sylvius and led to a considerable dilatation of both lateral ventricles. The degree of tension which must have resulted is shown by the condition pictured in Fig. 11, a photograph of the right half of the brain, from which the hernial protrusion had been shaved off at its base to show the site and extent of the implicated convolutions. It will be seen that there are numerous irregular openings over the surface. These communicated with the right lateral ventricle and connected it with the subarachnoid space overlying the protrusion. It is impossible to say whether the formation of these channels had proven in any respect an effective outlet for the cerebrospinal fluid pent up in the ventricles, but it would seem that nature had thus made an effort to establish drainage by a method similar to those which have been so ineffectually attempted by surgeons as a cure for hydrocephalus.

A case more unfavorable than this could hardly offer itself as a test for the success of any palliative method, presenting, as it did, a large growth so placed as to totally obstruct the ventricular outflow. Yet it can be seen that the underlying symptoms of pain and vomiting were completely relieved without the production of an enormous hernia and consequent paralyses of a serious nature, such as confronted us after using the older methods of making a bone defect. I have thus purposely chosen to punctuate my remarks with a number of unfavorable cases of intracranial tumor, for the reason that they illustrate the points which I wish to make better than do those which have had less serious complications, and, furthermore, because it has been possible in each of them to obtain an autopsy, without which the histories would be of much less value.

I have several patients at present under observation for whom this intermusculo-temporal method of decompression has been employed, with results that, for the time being, are most gratifying. One of them, operated upon two years ago (Fig. 12), had a rapid subsidence of the symptoms, the eye grounds becoming completely normal shortly after the decompression. He is an accountant, has returned to his work, and continues practically well, having, presumably, a very slow growing, or possibly a stationary, tumor in some silent area, for we have never had any lead as to its situation. The most recent case, another patient presenting no local-

izing symptoms, but bedridden for several months with profound headache, frequent vomiting and rapidly failing vision, was operated upon three months ago (July 1, 1905). He left the hospital in two weeks, free from symptoms,—his choked disc of 7 diopters having become flat in about eight days,—and he soon returned to his work as a laborer. Though marked amelioration of the pressure symptoms has characterized the other cases in the series, most of them have been less striking than these two, inasmuch as the situation of the tumor has in one way or another occasioned paralyses which make existence rather a sorry one. However, the patients remain, for the most part, free from actual physical discomfort, which, after all, was the object aimed at.

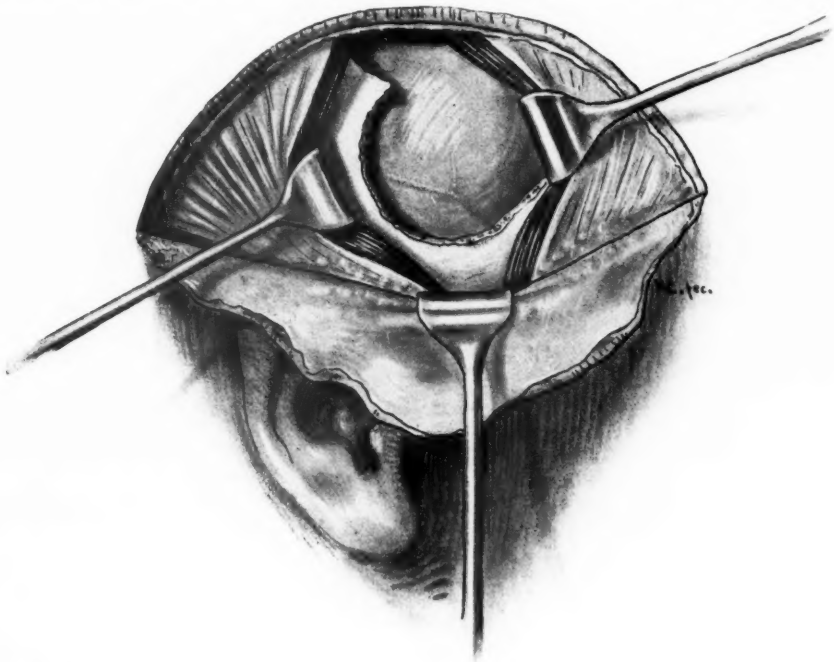


FIGURE 13.—Sketch of the intermusculo-temporal field of operation, showing exposure with bone defect partially made.

### THE TEMPORAL INTERMUSCULAR METHOD.

A curved incision is made over the side of the head concentric with and about one cm. within the line of origin of the *M. temporalis* at the temporal ridge (Fig. 15). It should not extend anterior to the hair margin and its posterior angle may be advantageously carried somewhat lower than the anterior. The scalp and the aponeurotic membrane are reflected downward, leaving bare the temporal fascia. An incision is made through this semi-transparent fascia in the line of the fibers at about the central part of the muscle where the fibers run in an oblique direction downward and forward. Less room will be had if a point is chosen where the fibres are more vertical, and their course from origin to insertion consequently shorter. The fascial edges are retracted, exposing the muscle bundles. The incision is then carried down to the bone in an interspace between the muscle bundles which are not divided. The anterior and posterior borders are then retracted as widely as possible and at the same time lifted from the skull, while the periostenum, as far as it can

FIGURE 14.—Sketch to show the relation of the temporal bone defect to the underlying cortex and the denuded area which will form the protrusion.

be reached, is scraped back with an elevator from the bony surface that underlies the muscle. A small primary opening is then made through the exposed squamous portion of the temporal. This is enlarged with rongeurs or ordinary bone-forceps to the desired size, the dura having been separated in advance (Fig. 13). It is necessary to have rather flat instruments, as the fascia and muscle cannot be lifted away from the bone sufficiently far to allow of the introduction of thick-bladed instruments under them. The opening which I have usually made has measured about 6 cm. in its vertical by 8 cm. in its antero-posterior diameter.

In all cases of brain tumor, not only the scalp, but the bone as well, is abnormally vascular. This is due, I presume, to the intracranial venous stasis, the effects of which are felt in the sinuses as well as in the smaller cerebral veins; and as there exist communications between the extracranial and these intracranial vessels, there naturally results an increased tension in the venous channels of scalp and diploë, which makes them bleed much more than under other circumstances. Bleeding from the diploë may be particularly troublesome, and frequently necessitates the use of wax. Care must be taken while biting away pieces of bone from under the muscle anteriorly, lest injury to the meningeal be occasioned. This occurred to me once, and necessitated a cross-incision in

the muscle, so as to expose and ligate the vessel. When the bone defect has been enlarged to the requisite size, the dura should be incised and cut away to its very margins. Here, again, some care must be exercised, for with a tense brain, which bulges tightly against the dura, cortical injuries may be occasioned; an accident which always increases the amount of subsequent protrusion, owing to the consequent hemorrhage and œdema. The dural incisions, too, should radiate in line with the posterior branch of the middle meningeal artery, after its ligation and division in the midfield, lest accidental injury of the vessel far under the muscle edge give annoying hemorrhage. With the exception of this main vessel, the pressure of the protruding brain against the edge of the bone defect should control the oozing from the intervening fringe of dura. The area of the cortex which protrudes and makes up the hernia is shown in Fig. 14. It will be seen that the temporo-sphenoidal lobe constitutes the chief portion. Over the denuded bone, the split temporal muscle is then brought together, and for this purpose I prefer interrupted, delicate, black-silk sutures. The fascia is similarly closed, and it is necessary to place the sutures at the very edges of the incision, else the inelastic fibrous membrane will not be satisfactorily brought together. A few sutures may then be placed in the occipito-frontal aponeurosis before closing the scalp. For the scalp, accurate approximation of flat surfaces is desirable for the sake of controlling hemorrhage—very rarely are any ligatures placed in the scalp—though there is less reason here for the extreme precautions which closure of the scalp demands when it alone, without any underlying muscle and fascia, must withstand the pressure of the resulting protrusion. The sutures in all cases are removed in forty-eight hours and the wound protected, if need be, with collodion gauze strips.

The operation may be carried out bilaterally, though in case of tumor I have never opened the dura on both sides, being somewhat fearful of the consequences of symmetrically bilateral cortical protrusions. The accompanying photograph (Fig. 15), taken of a patient four days after his operation( the sutures were removed on the second day), shows the line of the incision.

This intermuscular temporal method I have found useful, not only as a palliative measure, when the closed muscle and fascia act as a check for the hernia, but also in other conditions when they serve as the covering for a bone defect made for drainage or exploration. Once through, such an approach, I have divided the sensory root of the trigeminus, desiring at the same time to leave a large defect for decompressive purposes, as the patient had a basal tumor invading the cavum Meckelii and causing great pain from implication of the ganglion.

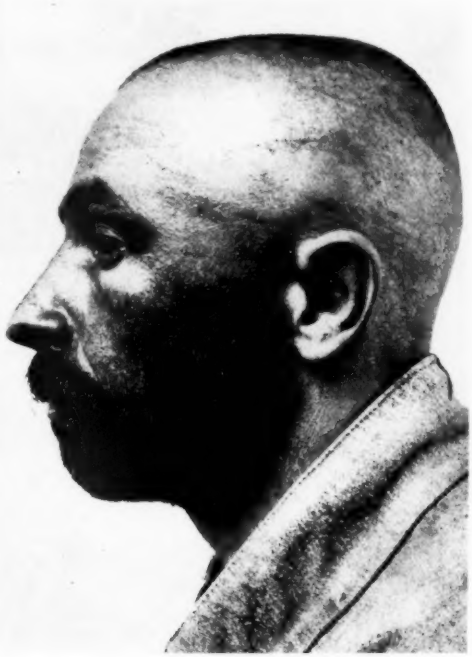


FIGURE 15.—Photograph of patient four days after a decompressive operation by the temporal route. To show line of incision. He had previously been bedridden. Complete alleviation of symptoms.

Several times the method has been used to drain the subdural space when fractures of the base have been accompanied by hemorrhage. There is no better way, in my estimation, in which to explore for an extradural meningeal clot, or for abscess of the temporal lobe.

### THE SUBOCCIPITAL OPERATION THROUGH A "CROSSBOW" INCISION

It is generally supposed that in case of suspected subtentorial growths it is better to decompress through an opening in the suboccipital region. And this certainly is the preferable place if one has been led to enter the skull at the occipital base with the reasonable hope of finding there a removable tumor; but, otherwise, I am not as certain as I would wish to be that the decompression is any more effectual than if accomplished by means of a defect placed elsewhere.[1]

Then the opening which one can establish by this route is smaller than those which can be made in the temporal regions, and much more difficult to make owing to the presence of the occipital sinus and its perforating emissary veins. The results of the operation also are somewhat more incapacitating, owing to the necessary division of the muscular attachments at the occipital ridge, but more particularly to the cerebellar ataxia which will be a consequence of the protrusion, even if this symptom was not already occasioned by the tumor itself.

I have used the same method of approach in these decompressive operations that has been followed in three successful cases of operation for the removal of tumor—a tubercle, intracerebellar cyst, and meningeal sarcoma. It is a natural method to follow, and probably very similar to that which others have employed. There are, however, some details that may be worth setting down.

I have found that a vertical median limb, (Fig. 16), as well as the curved transverse cut, is of advantage in making the exposure. The resemblance of the incision to a crossbow is apparent. It is a rule, I think, for most operators to limit themselves to the curved portion of the incision alone, and to make it over the muscular attachment just below the superior curved line. A higher incision is preferable, I believe, for the occipital arteries are almost necessarily divided in the dissection, and if their anastomoses with the posterior branches of the temporal arteries are not free, the scalp at the upper or concave edge of the incision will have a poor blood-supply, and the pressure of the bandages plus the weight of the head, if the patient lies on the back, may be enough to cause a decubitus. This accident occurred to one of my earlier patients, a child with a thin scalp and very heavy head, due to an obstructive hydrocephalus. It is advantageous also for the subsequent process of healing, not to have the skin incision directly over the line of transverse division of the cervical muscles.

After reflecting the triangles of skin-flap downward to a level just below the superior curved line, the flat superficial cervical muscles (chiefly the trapezius and complexus) are divided down to the bone in a curve concentric with their line of attachment, leaving at the upper side a fringe of muscle and aponeurosis sufficiently broad to facilitate reunion of the divided edges at the close of the operation. The vertical intermuscular incision is then carried down to the spines of the upper cervical vertebræ, care being taken to split the ligamentum nuchæ, and to separate the deeper muscles in the mid-line. They are then retracted to each side (Fig. 16) and the occipital base exposed as widely as possible, by scraping the periosteum, together with the attachments of the shorter and deeper cervical muscles, away from the bone. On each side, over the more prominent and thinner bosses of the exposed region, an opening is then made with trephine or burr, as preferred. These primary openings are enlarged with rongeurs, especial care being requisite when approaching the ridge at the mid-line, the crossing of which may require all of the surgical tricks for the control of hemorrhage from bone and dura that one can summon to his aid. Inasmuch as there may be large emissary veins entering the skull from the mid-occipital sinus, considerable bleeding may be expected while separating dura and bone at this point, and

[1] Indeed, I have once seen a most disastrous complication follow the procedure, under what, to be sure, were most unusual circumstances. It occurred in a young girl of 16, in whom Dr. Thomas and I were much interested a few years ago. She presented symptoms of tumor, the situation of which we were unable to determine. Two explorations had previously been made over both right and left frontal lobes with negative findings, but with considerable relief from the decompression alone. Some months later we were led to explore the cerebellar region, under the belief that the symptoms might be due to an involvement of the hind-brain. There was considerable protrusion of cerebellum through the bone defect, owing to the great tension, and when the child came out from under the anæsthetic, we found that she was practically decerebrated, unconscious, and with the muscular rigidity which Sherrington has described as accompanying the experimental division of the brain stem. She lived in this condition for about four months, and at the autopsy a mixed (teratomatous) tumor was found, probably a congenital affair, which lay in the mid-line, just beneath the cerebral peduncles. The natural conclusion was, that the backward dislocation of the brain, which the suboccipital opening permitted, had caused a sudden and lasting compression of the brain stem.

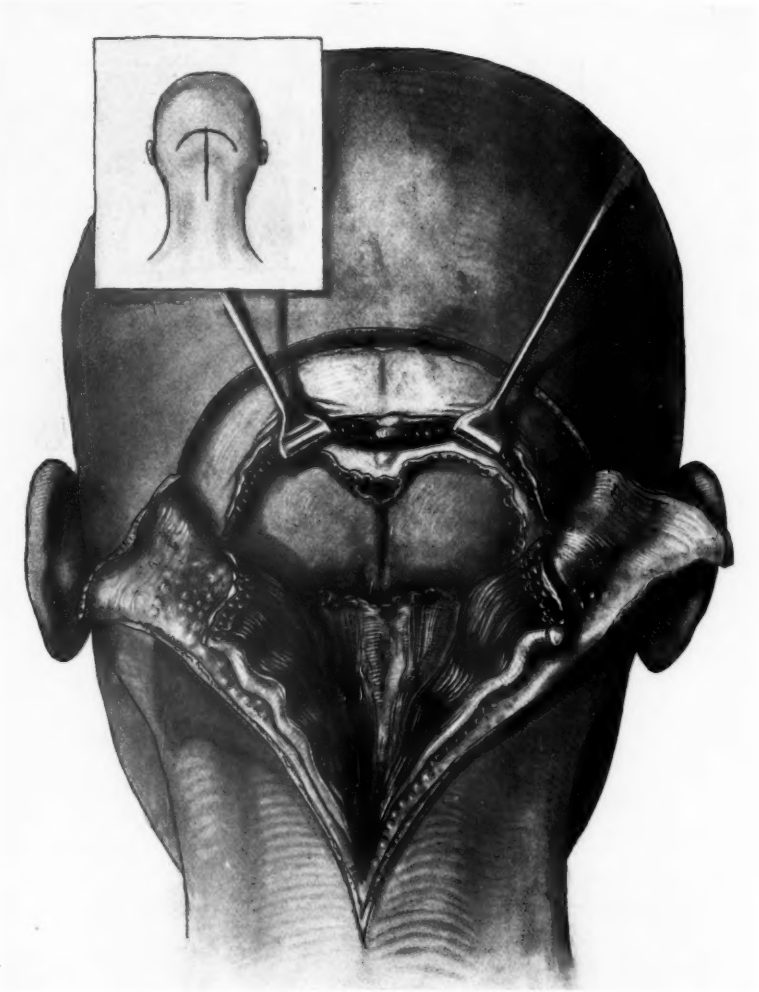


FIGURE 16.—Sketch of the field of operation, before opening the dura, in the suboccipital procedure. Note the high transverse cut of the "crossbow" incision.

that, too, from veins whose contents is under increased tension. I have found it helpful, at times, to crowd wisps of sterile cotton ahead of the dural separator when freeing the membranes from this mid-ridge, a procedure which necessarily ruptures these emissary vessels. The cotton aids the clotting, and the pressure of the tense and bulging dura against the bridge of bone still remaining usually prevents any considerable escape of blood until thrombi have formed. Owing to the hemorrhage from this source, I once found it necessary to postpone further progress until a second sitting, although I regard a two-stage operation, particularly for decompressive purposes, with great disfavor.

The opening in the bone (Fig. 16) is enlarged in all directions as far as possible, even upward under the fringe of divided muscle, so as to expose, if it is desirable, the lateral sinus on each side of the torcular. The occipital protuberance itself, as well as the region on each lateral side, where lie the foramina of exit for the large emissary veins back of the mastoid, had best be given a fairly wide berth. In a downward direction, the opening may be enlarged as far as the foramen magnum, and in one of my cases of tumor, the posterior margin of this foramen was easily rongeured away so as to give better access to the growth, which was almost entirely under the cerebellum.

When the bone defect has been increased to the desired size, a transverse incision is then made in the dura on each side of the median occipital sinus, which should be carefully approached from each side and ligated—not always an easy task. Dr. Frazier has advocated this step in his admirable paper on cerebellar tumors, and it is one which I have found desirable, not only for the sake of obtaining a wide view in tumor cases, but also to insure a sufficient exposure for decompressive purposes. It has been my custom to cut the exposed dura away entirely.

The wound should be closed in layers, and, if possible, without drainage, but if this seems inadvisable, a wick of protective—to be removed at the first dressing in 48 hours—may be left in one or more of the operative angles. Should a drain be left in the wound, care must be taken that it does not lead directly to the bulging and denuded cerebellum, lest there be danger of encouraging subsequent fungus formation through this weakened spot.

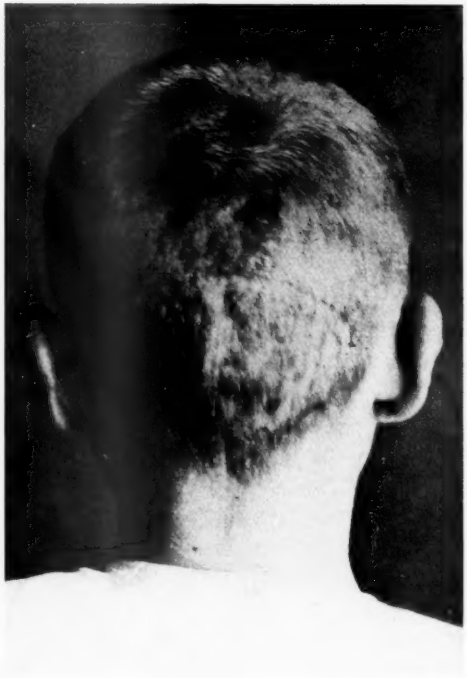


FIGURE 17.—Photograph of patient two weeks after a suboccipital decompressive operation. Showing the "crossbow" incision and small, well-protected hernia.

The accompanying photograph (Fig. 17), taken of a patient two weeks after a successful palliative operation in this region, shows the situation of the "crossbow" incision. The slight bulging of the hernia under its muscular protection is also apparent to some degree, even in this direct view.

# FIBROMA OF THE GASTROHEPATIC OMENTUM IN THE LESSER PERITONEAL CAVITY

## FIBRO-MYXO-MYOMA TELANGIECTATICUM OF THE GASTROHEPATIC OMENTUM

By JOHN B. MURPHY, A. M., M. D., OF CHICAGO
Professor of Surgery, Rush Medical College

PRIMARY growths of the mesentery are rare. Klebs, in speaking of the mesentery, large and small omentum, says: "Connective tissue tumors are rare in these places." Still more so are primary tumors of the gastrohepatic omentum. Secondary tumors of the neighboring organs, however, and especially of the stomach, may involve the gastrohepatic omentum. There are about fifteen fibromata of the mesentery on record. They generally spring from the posterior abdominal wall, according to Orth. While tumors of the mesentery are so rare, they show a great variety of structure, which can be explained by the great variety of tissues in the mesentery, as endothelial cells, areolar (fat) and connective tissue, lymphatics, blood-vessels, and nerves. Tumors of the mesentery are liable to secondary changes: chondrification, caseation, and ossification; and they are sometimes of an unusual size.

Giant tumors of the mesentery are described by Waldeyer, a lipoma of 63 pounds; Térillon, lipoma 59 pounds; Van der Veer, lipoma 56 pounds. Péan removed one weighing 56 pounds.

The youngest patient is one recorded by Dickinson, a child 2 years old; and the oldest, one of Berthelot, a man 87 years of age.

Pearce-Gould says: "Primary new growths in the gastrohepatic omentum are exceedingly rare." So far as we are able to ascertain from the literature, there are recorded only two primary tumors of the gastrohepatic omentum, beside ours. A careful study of the literature was made by Pearce-Gould, who was unable to find more than one case similar to his own. We think it will not be superfluous to refer to the two tumors on record and to give an extensive description of our own case.

The first one recorded is a large fibroma of the small omentum by J. Jackson Clark,[1] M. B.

[1] Trans. of the Path. Soc. London, Vol. XLIII, 1892, p. 60.

The patient was a woman 50 years of age, very emaciated, with a large abdominal tumor of four years' standing. The tumor was hard and fixed. There was resonance between it and the pubis, and dullness elsewhere up to the fifth rib. It increased steadily in the last year and caused pain. It proved to be a large fibroma situated between the layers of the small omentum, "which could be separated from its outer surface by tearing the very numerous vessels which passed into it from the subperitoneal plexus." The woman died eight days later from congestion and œdema of the lungs. The uterus contained several fibro-myomata. The tumor originated probably in the cellular tissue of the gastrohepatic omentum.

The second case is a sarcomatous tumor of the gastrohepatic omentum reported by Pearce-Gould. (Published in the Medico-Chirurgical Transactions, 1900, page 257.) He states that he reports it for four reasons, the principal one being the rarity of tumors in a situation (gastrohepatic omentum) where primary new growths are exceedingly rare. The patient, male, 38 years of age, was admitted to the hospital October 10, 1895. An abdominal tumor was found. It had a round outline and was tense, firm, and uneven on its surface. It extended from the tenth left costal cartilage along the left linea semilunaris to the pubis, filled out the right groin, and the edge could be traced up to the eleventh rib on the right side. The tumor was movable. No stomach note was detected in the epigastrium or in the left hypochondrium. Operation October 17, 1895. The tumor was not adherent to the liver, spleen, or kidney. The stomach and intestines were pushed down into the pelvis. The tumor had a pedicle which contained a large vein. It was ligated. The man left the hospital December 4th, and there was no recurrence after four years. (Hunterian Museum, No. 2354 C.)

In considering the differential diagnosis of his case, Gould gives the following points:

1. From retroperitoneal tumor.
   a. It was movable.
   b. Could not be separated from the liver.
2. From hydatid tumor.
   a. There was no fluctuation, and it had a different outline.
3. From cancer or sarcoma of the liver.
   a. Great size of tumor.
   b. Absence of vomiting, wasting, jaundice and ascites.
4. From tumor of the spleen.
   a. Central position.
   b. Resonance behind it on the left side.
   c. Absence of grave constitutional symptoms.
5. From tumor of the kidney and adrenals.
   a. Central position of the tumor.
   b. Lateral mobility.
   c. Intestinal percussion note behind the tumor.

Gould was able to locate the tumor in the omentum, but would not go further and diagnose its exact location, namely, in the gastrohepatic omentum. He stated that the diagnosis could have been possible, since percussion could not detect any resonance of the stomach in the epigastrium. According to him, if we are able to ascertain that the tumor is not of the spleen or the liver, and if it pushes the stomach and intestines downward, it is in all probability situated in the gastrohepatic omentum. As we stated before, secondary tumors of the lesser omentum may occasionally be found. Malignant tumors of the stomach may extend upward, or secondary malignant growths in the lymphatic glands of the portal fissure may invade the lesser omentum. Aneurism of the hepatic artery also forms a tumor in the small omentum. Collections of fluid in the lesser sac of the omentum are sometimes spoken of as cysts of the lesser omentum, which term, of course, should be abandoned.

A report of our case is as follows:

Mr. A. J. Nativity, Norway; age 49; widower; occupation, none.

*Family history:* negative.

*Previous history:* He had the ordinary diseases of childhood under 10 years of age. Typhoid fever at 12. Malarial fever at 19; was sick three weeks. Gonorrhea and syphilis at 21; he has been treated eighteen consecutive months for syphilis. Had no post-syphilitic symptoms until 15 years ago. In 1890 he had a sudden paralysis of the left arm and the tongue, with defective sight and poor memory. He made a fairly rapid recovery in a few weeks, and finally had complete restoration.

Present illness: In 1896 patient discovered a hard lump the size of a hazel nut about two fingers above the middle of left Poupart's ligament. The lump caused no pain or discomfort, and in 1898 it disappeared. This was followed by the appearance of a second small tumor about five inches above Poupart's ligament. The tumor had the same characteristics as the lump above described. It was not painful and grew slowly.

In July, 1904, the tumor began to grow rapidly and in a few weeks reached the size of a fetal head. No subjective symptoms were associated with it at any time. (The peculiarity of the case is the entire absence of subjective symptoms.) His appetite was always fair. He had no gastric symptoms. He was constipated. He had had incontinence of urine for last four months, and constant pain in the lumbar regions and along the right ureter. Had frequent shooting pains in the limbs and some difficulty in walking. Had not lost weight.

*Examination of patient:* He weighed 140 pounds; medium stature; general nourishment, below par.

Urine: Trace of albumen; occasional hyaline cast; red corpuscles 5–10; white 1–2.

Blood: Reds, 4,640,000; whites, 14,500; hemoglobin, 95 per cent.

Skin: normal color; no eruptions; no anemia.

Eyes: Atrophy of the left optic nerve and drooping of left lid; Argyll Robertson pupils.

Lungs: Normal.

Circulatory organs: No enlargement of heart; no murmurs at the orifices of the heart and large arteries; no arterio-sclerosis.

Abdomen: Liver not palpable. Spleen, *idem*. On palpation we detected a large, hard, movable tumor in the abdomen. It extended upward to the xyphoid process, downward four fingers below the umbilicus, and laterally it occupied the entire right and left hypochondria. It was movable vertically and horizontally. It was not painful, nor even sensitive to the touch or palpation, nor to lateral movements. The upper portion of the tumor was flat on percussion and the lower was tympanitic, which suggested the possibility of a coil of intestine being interposed between the tumor and anterior abdominal wall. The mass was solid, lobular in form, and could roughly be compared to a fetal head.

Kidneys: Right, palpable, enlarged, and sensitive, left not palpable.

From the above it will be noted that the patient has almost all the classical symptoms of tabes dorsalis: (a) Argyll Robertson pupil; (b) Romberg's sign; (c) Westphal's sign, etc.

*Differential Diagnosis*.—The right kidney, as stated, was distinctly palpable, somewhat enlarged and sensitive to pressure, but it had no connection with the tumor. The left kidney was not palpable—but the tumor did not extend to the left. We excluded a tumor of the intestinal mesentery because of the relatively high situation of the tumor and its location more to the right than to the left. Dullness of the spleen was normal, and the organ was not palpable. Absence of wasting, vomiting, and jaundice spoke decidedly against a tumor of the liver. By exclusion we approximated the correct diagnosis as to its location in the lesser peritoneal cavity; however, no definite diagnosis as to the exact nature of the tumor was made before the exploratory examination was performed. The fingers could be inserted between the tumor and edge of liver, the latter organ being movable, independent of the tumor.

Gastric inflation would have aided by showing the relation of the stomach to the tumor, and colonic inflation would have shown that the colon was distinctly below the tumor. As the man gave a history of syphilis and was tabetic, we thought for a moment the tumor might be a gumma of the mesentery.

The diagnostic points emphasized by Gould in his case are the high situation of the tumor and the downward displacement of the stomach and intestines, or in other words, the absence of resonance and the presence of pronounced flatness in the normal region of the stomach. In our case, however, the downward displacement of the stomach was only relative; resonance was obtained in front of the tumor.

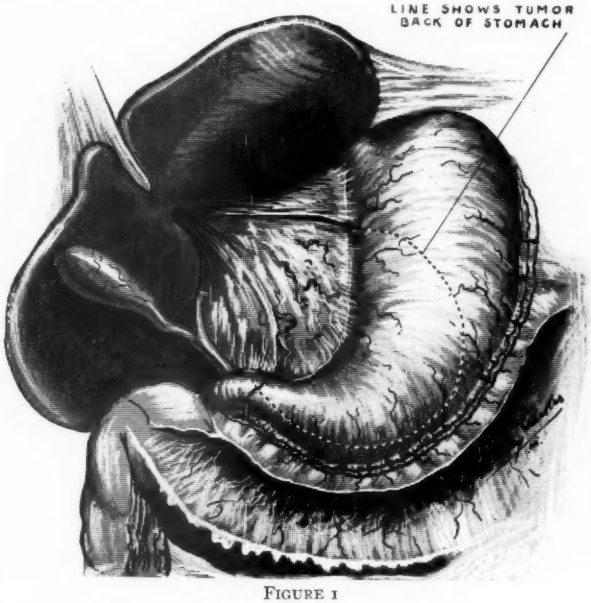



FIGURE 1

A prominent feature in our case is the absence of any subjective symptom. The tumor did not cause the patient even the slightest discomfort. He stated: "If I could not feel it, I would not know I had it." Another important feature is the insignificant size of the tumor during almost nine years, and its rapid development during the last few months.

The fact that the tumor did not cause any subjective symptoms may be explained by the anesthesia which is so often found in tabetic patients. However, the patient complained of

FIGURE 2

pain in the right kidney. The degenerative changes of the tumor may explain the rapid growth.

Operation Feb. 15, 1905: A vertical incision was made in the epigastric region through the right rectus muscle and the peritoneum opened. The tumor was situated behind the stomach and was reached by dividing transversely the gastro-colic-omentum and turning the stomach and tumor out of the abdomen. It was then noticed that the tumor developed in the posterior portion of the gastrohepatic omentum and extended downward on the posterior wall of the stomach, elevating the posterior peritoneal layer. (Fig. 1.) The tumor was partly enucleated from between the layers of the lesser omentum and rolled away from the posterior stomach-wall, most of the lesser omentum being removed with it. The edges of the gastrohepatic omentum were brought together by catgut sutures, and the abraded surface on the posterior stomach-wall covered with peritoneum. The gastro-colic omentum was closed so that the intestines could not penetrate into the lesser peritoneal cavity. In extirpating the tumor, a section of the gastrohepatic omentum was removed with it, but the coronary artery and accompanying veins were not disturbed. The vessels which enter the tumor from both sides showed that it had grown between the layers of the mesogastrium. The exact situation of the tumor primarily was in the gastro-hepatic omentum on the lesser curvature of the stomach. The tumor was covered on its posterior surface by enormously enlarged veins; some the size of the index finger. These large vessels seemed to originate from the superior gastric veins and from the gastrocolic omentum.

In the two days previous to the operation his temperature and pulse were normal.

Examination of blood: Erythrocytes, 4,640,000; leukocytes, 14,500; hemoglobin, 95 per cent.

Examination of urine: Albumen, trace; sugar, absent; microscopic, occasionally a hyaline cast; 5–10 red-blood corpuscles to a field and 1–2 pus-cells.

*Macroscopic Description of Tumor.*—See figures 2 and 3.

Weight 34 oz. (1088 grams); long diam. 15 cm.; diagonal diam. 16½ cm.; transverse diam. 12 cm.; height 8 cm. The size and shape could be compared to an egg-plant. The surface of the tumor was very vascular. Many cystic elevations covered the tumor, the contents of which were semi-fluid, and yellowish in color. There were also a few nodular elevations, firm in consistency. These cysts and elevations varied in size from a cherry to a walnut. The tumor was well circumscribed and inclosed in a firm fibrous capsule.

Sulci, varying in depth from ½–1 cm. ran in all directions on the surface. Section of the tumor showed a reddish pulp and scattered islands of degenerated tissue. It was semi-solid in consistency. A few fibrous bands

FIGURE 3

traversed the substance of the tumor. The tumor was preserved in Kaiserling's solution. Pieces were hardened in absolute alcohol (1 hour) and cleared in equal parts of benzol and toluol.

*Microscopic Examination.* — The tumor proved to be a fibroma, with scattered areas of myxomatous degeneration; some muscular tissue was present. The walls of the vessels were very thick and the lumina moderately dilated. In short, the tumor was a fibro-myomyxoma telangiectaticum.

*Post-Operative Course.* — The temperature ran to 100° (max.) the day after the operation. It was then normal until February 26. From that date the patient then had a temperature of from 100–103° (max.) late in the afternoon, always preceded by a chill.

The pulse was always below 100, weak, and not in consonance with the temperature.

General condition: The patient was very weak and pale. After February 26th, he developed severe pain in the right lumbar region and along the right ureter.

On March 11th, the urinary findings pointed to a suppuration of the right kidney. Palpation detected a considerable enlargement of the organ. The pain in the right lumbar region and along right ureter increased daily until March 11th, when the kidney was opened and drained. The cortex was atrophied and the pelvis greatly distended. Drainage-tubes were inserted; urine and pus drained freely for several weeks.

Temperature since March 11. The day following operation, temperature ran to 106° (max.). The next day it was normal, and the third day it reached 100° in the afternoon. Ever since then his temperature has been normal. This was an ascending infection from the bladder in which there was residual urine, distension, etc., due to the tabetic condition.

Leukocytosis, February 14, 500 (day preceding operation); March 3, 15,800; March 9, 21,100 (two days before second operation). The leukocyte count rapidly diminished after operation.

Urinary findings: Preceding operation—Albumen, trace; sugar, absent; occasionally a pus-cell. Following operation—Albumen, present some days; blood, present (moderate); pus-cells, 10–20, increasing every day until the day of second operation, when field was packed with pus-cells; casts, present (hyaline and granular) only the first two days after operation. The urine was alkaline, very turbid, and half of it was always composed of pus and mucus.

After the drainage of kidney, patient made a rapid recovery. The tube was removed and the sinus closed.

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# DERMOID CYSTS OF INTESTINE AND MESENTERY[1]

BY WILLIAM JEPSON, M.D., SIOUX CITY, IOWA

IN presenting the clinical history with the gross and microscopic findings of two cases of cysts associated with the intestinal tract and mesentery, I am not unmindful of the fact that I am introducing a subject which is possibly possessed of greater interest to the pathologist and embryologist than it is to the surgeon. However, as all of these cases, though primarily benign, tend to ultimate grave disturbance of bowel function, or lead to a peritoneal involvement through secondary degenerative changes of their structure, or the changes incident to infection, they must all be looked upon as constantly tending toward the hand of the surgeon, where they may receive that management which only can be of avail.

CASE 1. The patient, Miss M. J., age thirty-two, was first seen by me March 22, 1902, at which time she complained of suffering considerable distress in the right hypochondriac, lumbar, and iliac regions. The distress of which she complained was defined by her as consisting of pain, which was variable in degree and intermittent in character (which was interpreted as being due to increased intestinal peristalsis), not sufficient, however, to prevent her from the pursuit of her duties—that of a domestic. This pain was

[1] Read before the Western Surgical and Gynæcological Association

aggravated upon undertaking hard work, such as sweeping, washing, etc., so that at times she felt herself quite incapable of the performance of these parts of her labors. She had considered herself in good health until some seven or eight months previous, at which time the first manifestations of her trouble, as above described, made their appearance. She had never suffered any illness since childhood. Aside from the pain and discomfort which she experienced, she considered herself in good health, with the exception of the fact that she had noticed a constant increasing tendency to constipation, which had made its appearance two or three months previously, so that she now found it necessary to resort frequently to the use of laxatives. She expressed herself as finding considerable relief after free evacuation of the bowels.

*Physical examination* revealed the existence, at a point midway between the umbilicus and the antero-superior spine of the ileum, of an intra-abdominal enlargement, which gave the impression of being about the size of a hen's egg. It was freely movable within an area whose diameter was about three and one-half inches. Distension of the colon with air pushed the tumor forward and internal, and diminished its mobility. The right kidney was possessed of abnormal mobility. Examination of other intra-abdominal viscera elicited no abnormalities.

The diagnosis made was that of a solid tumor or a cyst, whose wall was very dense, or whose contents was semi-solid. The possibility of the same being one of the various forms of mesenteric cysts, a cystic appendix, or a sequestrated growth of the uterus or its adnexæ, or a distended Meckel's diverticulum, were considered, as was also the possibility of it being a malignant growth of the cæcum. As to origin, it seemed that the kidney, liver, pancreas, and uterus, with its adnexæ, could be excluded, owing to the phenomena elicited when the colon was distended with air. It was believed to have its origin from the colon or mesocolon, or at least to be attached to it. A satisfactory explanation of the character or origin of the growth was, however, not reached prior to operation, and it must be said that even after removal and careful examination of the gross specimen, as well as microscopic sections, that some difficulty has been experienced in satisfactorily classifying it. An exploratory cœliotomy was advised, with a view of determining its character, as well as undertaking its removal if such were found to be expedient.

Accordingly, on April 1, 1902, the growth was exposed through an incision parallel with the external border of the right rectus muscle, and was found to be located in the anterior external aspect of the wall of the colon about four (4) cm. above the ileo-cæcal valve. It was covered by the peritoneum, through which the cyst was plainly observable. It was removed by making an elliptical incision through the serosa and dissecting out the growth. This was done with a great deal of difficulty on its internal aspect, owing to the fact that here it was apparently covered only by the intestinal mucosa. Enucleation was accomplished, however, without opening the intestinal tract. From noting, in the process of enucleation, the structures which surrounded the cyst, I was led to believe that the growth primarily had its origin in the muscular wall of the intestine, and through its growth had led to thinning and absorption of the same at the sites where it was covered only by mucosa and peritoneum. The area of the tumor surface upon its internal and external aspect was covered by a mucosa and peritoneum, respectively, and was apparently about two (2) cm. in diameter. The muscular coat was approximated by interrupted sutures of fine silk. The peritoneum was closed by Lembert sutures; the suture line being placed transverse to the long axis of the bowel in order to avert the possibility of subsequent stenosis.

Recovery was uneventful.

### DESCRIPTION OF GROWTH

The growth was a monolocular cyst, whose shortest circumference was 15½ cm., and longest circumference 18½ cm. The physical characteristics of the cyst are shown in Figures 1 and 2.

The contents of the cyst consisted of a yellowish pultaceous material not unlike that which occupies a sebaceous cyst in the instance of wens, or again as seen in dermoids of the ovary. Fatty degenerated epithelial cells and crystals of cholesterine were found in the mass. No hair was present. Microscopic findings: the cyst was lined with flat pavement cells, and at points by cylindrical epithelial cells. (At no point did the cyst communicate with the lumen of the bowel.) It is thus observed that this cyst may be classed amongst dermoids, owing to the character of its contents and the epithelium lining.

FIGURE 1.—Photograph of cyst of colon.

CASE 2. S. M. J., of Gordon City, Iowa, referred to me, at the University Hospital, by his attending physician, Dr. Rice, of Roland, Iowa. His family and personal history were negative, in so far as they could possibly have any bearing upon his condition. He had never suffered any injury of the abdomen, or any but the most trivial of gastro-intestinal trouble. About two years prior to entering the hospital he became conscious, through palpating his abdomen, that there existed a growth within the same, which was found on the right side. He had never experienced any discomfort from the same, except that of late it had been necessary to resort constantly to laxatives or enemas in order to secure evacuation of his bowels. He had never experienced any pain in connection with the growth.

*Status Præsens.*—Inspection revealed the presence of marked prominence of the right hypochondriac lumbar and umbilical region. Palpation disclosed this to be due to the presence of a growth apparently about 12 cm. in diameter. It was spheroidal, without nodulation, and quite elastic, and possessed of a moderate degree of mobility. Percussion after inflation of the bowels with air disclosed the growth to be surrounded by intestine, and crossing the growth there existed a band of resonance, indicating the presence over the growth of a distended portion of the intestine. It was deemed possible to exclude all of the solid intra-abdominal viscera from any connection with the growth, excepting it be the head of the pancreas, which it was thought might give rise to the cyst in event of its being movable or placed abnormally low. A diagnosis resting between a mesenteric and pancreatic cyst was made.

Removal of the growth was advised, and the same undertaken July 12, 1902, it being exposed by an incision made through the right linea semilunaris. The growth was found to occupy a position between the two layers of that portion of the mesentery supporting the intestine between 40 to 46 inches from Bauhin's valve. The growth had stretched the right layer of the mesentery much more than the left layer. The two layers of the mesentery were separated to accommodate the growth to within about 1½ inches of its mural attachment, while at the intestinal attachment the separation was complete, leading to the intestine being uncovered by peritoneum for about one fourth of its circumference and for a distance of about 6 cm. The intestine coursed over the left anterior aspect of the tumor, due to the fact that the direction of the growth was to the right of the mesial line of the mesentery. An incision was made in the right layer of the mesentery, extending from the lower part of the growth to within 1½ cm. of its junction with the intestine. The capsule of the cyst was easily exposed, and enucleation of the same accomplished by rolling the peritoneum back with the finger covered with gauze. Separation from the intestine was readily accomplished, there seemingly being no association between the two, aside from the muscular wall of the intestine lying directly upon the tumor. Bleeding was very slight, and what existed was easily controlled

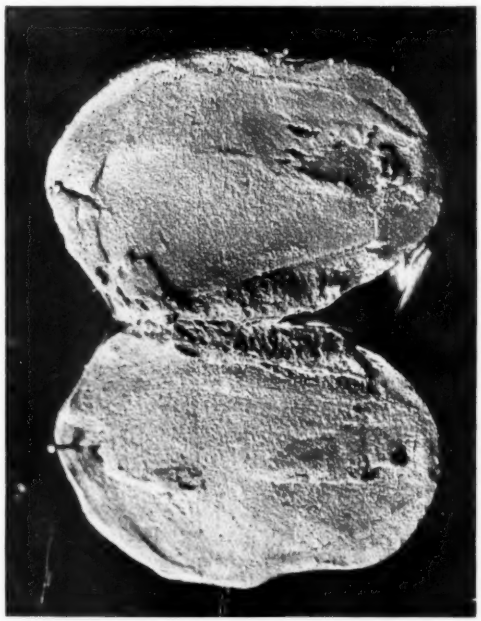

FIGURE 2.—Cyst shown in Figure 1, laid open, showing pultaceous contents.

by pressure. The portion of the intestine left uncovered by peritoneum after the removal of the growth was represented by an area of about 6 cm. long and about 2½ cm. wide at the point of greatest width. The two layers of the peritoneum constituting the mesentery at the site of separation from the intestine were brought together by through-and-through quilt-sutures of fine silk, so that the peritoneum was restored to its normal condition of covering the intestine. The incision made in the right layer of the mesentery for the removal of the growth was closed throughout, excepting a small aperture at the

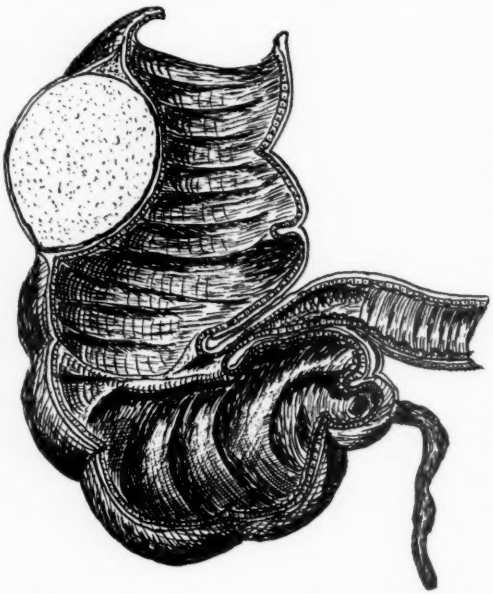

FIGURE 3.—Drawing illustrative of position of cyst in wall of colon.

lower angle, left for escape into the peritoneal cavity of such oozing of blood and serum as might take place; it being hoped in this way to avoid any possibility of separation of the two layers of the peritoneum constituting the mesentery, which might otherwise occur if such wound secretions were kept under tension. Recovery was uneventful, the patient leaving the hospital on August 1st.

The gross appearance of this cyst may be noted by reference to Figures 5 and 6. Its shortest circumference was 28½ cm. and longest circumference 39 cm. The contents of the cyst consisted of a putty-like substance of a grayish yellow color. Some cholesterine crystals were found in the same. The wall is approximately 2 mm. in diameter, consisting of connective tissue-structure lined with a layer of cells of cylindrical type, with areas where the cells have the characteristics of pavement epithelium.

While it cannot be said that these two cases have presented any surgical problems, unless it be in the matter of a diagnosis, or disclosed a necessity for a surgical technic in their treatment which is of especial importance, yet they help to emphasize the fact that cysts in connection with the intestinal tract are to be considered when dealing with intra-abdominal growths, and furthermore, that such cysts are possibly not as rare as would be judged from a perusal of even the best text-books of the day, in which, with few exceptions, we will find no allusion to the subject. Treves, in his "System of Surgery," makes a brief reference to the subject of mesenteric cysts, while scattered through the various medical journals may be found references to cysts of the mesentery and intestine, the total number of which probably does not greatly exceed one hundred cases. The two cases here described are possessed of such marked similarity, both as to their gross and microscopic characteristics, that they must be looked upon as belonging to the same variety of cysts, a variety which has many of the characteristics of dermoids. The cysts, however, differ widely as to the structure in which they were formed, one being intestinal, the other mesenteric. It is well recognized that the mesentery may be the seat of a variety of cysts, namely:

First. *Serous Cysts*, which may be unilocular or multilocular, the latter of which is the more frequent and of greater surgical importance, and may occur in the mesocolon, especially that of the descending colon as well as the mesentery. The contents of such cysts is alkaline fluid with a specific gravity of about 1015, and containing considerable quantities of albumin, the color vary-

ing from a pale yellow to a straw color. The origin of such cysts may be looked upon as being—

(a) Dilatation of a portion of a lymphatic vessel back to the point where its lumen has been occluded from some pathological process.

(b) Hemorrhages into the structures between the layers of the mesentery.

Second. *Chyle-Cysts* may be due to dilatation of the lacteals of the mesentery, or to degenerative changes in the lymphatic glands. Such cysts may be unilocular or multilocular, and in the latter form, the contents of the loculi may vary in their characteristics. Such cysts at times reach a considerable size in their growth.

Third. *Blood-Cysts*, or such cysts as have their origin from hemorrhage into the mesentery, which may be the result of a trauma or pathological changes in vessel-walls which lead it to give way on lesser provocation, or again into previously existing tumors or cysts. The development of cysts from hemorrhages into the mesentery is of course analogous with similar processes observed elsewhere in the body.

Fourth. *Dermoid Cysts*. The development of dermoid cysts in the mesentery, while of rare occurrence, must be looked upon as quite within the range of possibility, for here may exist the remains of embryonal structures, namely, the Wolffian and Müllerian bodies and ducts and the vitello-intestinal duct in connection with Meckel's diverticulum from which such cysts may have their origin. Cysts of this character have been reported by Bantock, Dupuytren, König, Lebert, Langton, Schutzer, and Wells.

In addition to the foregoing cysts of the mesentery, we may have pathological conditions of the lymph-vessels of the mesentery, for example:

(*a*) Lymphatic varices.

(*b*) Lymphatic nævus.

(*c*) Lymphangioma cavernosum.

Most of which, however, are of but slight surgical importance. The cysts which may be found in the intestinal wall are:

(1) *Chyle-Cysts*, having an origin here much the same as that of the mesentery.

(2) *Retention-Cysts*, resulting from inflammatory process, and most frequently found in the colon.

(3) *Dermoid Cysts* (Enteroides), most frequently observed in the small intestine. As regards the position of the intestinal cysts, they may be subserous, intramuscular, and submucus. (Fig. 4.)

In considering the subject of mesenteric and intestinal cysts, it is not to be overlooked that cysts having their origin in adjacent structures, as, for instance, ovarian dermoids, may form adhesions to the intestine or mesentery, which, becoming vascularized, may nourish the growth, while the attachment to the organ from which it primarily originated may become lost. Such cysts may, upon first

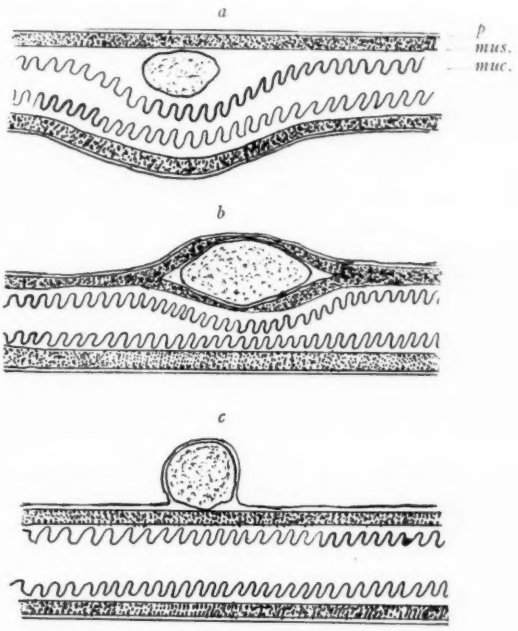


FIGURE 4.—Drawing (from Terrier and Lecene) Illustration of the position of intestinal cysts, with reference to the structures of the intestinal wall.

(*a*) Submucous position.
(*b*) Intramuscular position.
(*c*) Subserous.
(*p*) Peritoneum.
(*mus.*) Muscularis.
(*muc.*) Mucosa.

thought, impress one as if they had their origin primarily in the structure in which they are formed. I will not occupy your time by any speculation upon the histogenesis of the two cysts here reported, as it is questionable

FIGURE 5.—Photograph showing gross appearance of mesenteric cyst.

whether it would be fruitful of any real value in consideration of this subject from a clinical standpoint. It suffices to say that the origin of the mesenteric cyst here reported finds a possible explanation in the remnants of embryonic structures previously referred to as possibly existing between the layers of the mesentery.

As regards the cyst in the first case reported, it is certainly with much difficulty that one can explain satisfactorily the presence in the head of the colon of the histologic structures from which a dermoid cyst might be expected to develop. One would naturally incline to the view that it had its origin from remnants of embryonic structures of epiblastic origin. Yet, how this could be displaced to a point so remote from areas of the intestinal tract with which it is usually associated, is difficult to understand. Dr. Gfeller (*Zeitschrift für Chirurgie*, Sept., 1902), in an article on "Congenital Cysts," has given full consideration to the various theories of the histogenesis of congenital cysts, to whose article I would cite those of you who may be especially interested in this phase of the topic. I will here introduce a brief résumé of the salient features of clinical interest in connection with the nineteen cases reported by him as well as the case here reported. As regards their age:

Three occurred in the new-born.

Three occurred in children aged from 3 to 12 days.

Three occurred in children aged from 4 to 21 months.

Four in children aged from 5 to 15 years.

Six occurred in adults between the ages of 25 and 60 years.

Eleven of the cases were females and 6 were males, in 3 instances no sex being given. In 11 of the cases there existed symptoms indicative of the trouble; namely, intestinal obstructions in 6; indifferent symptoms, such as abdominal pain and swelling, in 3. In 8 of these cases removal of the growth was undertaken; in 3 instances, by resection of the bowel containing the growth; in 3 instances (mine included), by enucleation of the cyst; in 1 instance the cyst was fixed to the abdominal wall and drained; in one case the method of operative procedure is not given. Of the 8 cases subjected to operation, 4 died and 4 recovered; of the 4 recoveries taking place, 3 occurred in cases wherein enucleation was accomplished, and in 1 of the cases where resection of the bowel was undertaken. The 4 cases recovering were aged 12, 15, 25, 32, the youngest patient operated upon being 6 years, the oldest 62 years. As regards the position of the cysts, in 14 instances the same was found some distance from the ileo-cæcal valve, while in 5 instances they were close to the same; in 9 instances the cysts existed on the convex, and in 5 instances on the concave side, that is, upon the side of its mesenteric attachment.

In 10 of the cases the cyst was intramuscular.

In 3 of the cases the cyst was submucous.

In 2 of the cases the cyst was subserous.

In 2 of the cases the cyst was pedunculated.

In 3 of the cases there existed communication with the lumen of the intestine.

### SYMPTOMS, DIAGNOSIS, PROGNOSIS, TREATMENT

With our present knowledge of the symptomatology of mesenteric and intestinal cysts, it would be worse than useless to discuss

means of differentiating one form from the other (although it must be granted that at times there may exist symptoms which may make it partially possible), much less the possibility of determining the variety prior to exposure and critical microscopic examination.

There exist, however, some symptoms, more or less characteristic of both mesenteric and intestinal cysts, which may aid in differentiating them from other intra-abdominal enlargements and lead to a provisional diagnosis. These symptoms naturally resolve themselves into those referable to the growth itself, and those occasioned by disturbances of the functions of the intestinal tract or to peritoneal involvement.

*Presence of Tumor.* The recognition of an intra-abdominal growth whose origin from the solid viscera can be excluded must, of course, constitute the first reliable basis for a diagnosis. Such cysts are generally spherical in shape and possessed of a smooth surface, except when multilocular, when they may be

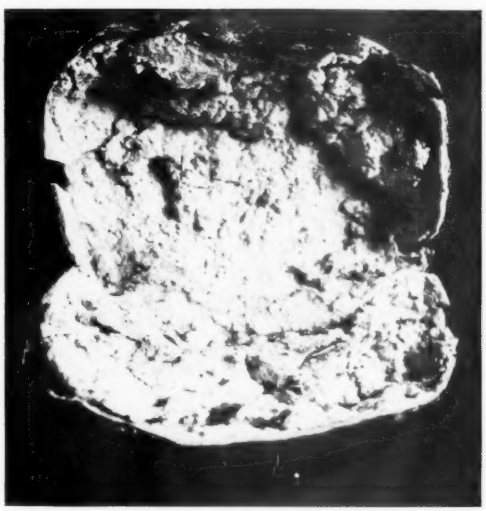

FIGURE 6.—Cyst shown in Figure 5, laid open, showing putty-like contents.

lobulated. Their cystic character may at times be recognized through fluctuation being elicited where the cyst-wall is not very thick or contents very dense or under high tension. A lipoma developing in the mesentery or omentum may, however, simulate this phenomenon.

*Mobility of Tumor.* Free mobility is a further characteristic. This, however, will vary much, depending upon the part of the intestinal tract or mesentery involved. Thus an intestinal cyst will be possessed of a mobility (provided it has not become adherent to adjacent structures) equal to that permitted by the mesentery of the intestine from which it has its origin. Therefore, when arising from the jejunum, ileum, or transverse colon, the range of mobility might vary from two to ten inches in any direction. On the other hand, if arising from the ascending or descending colon, the range of mobility must be limited. As regards the degree of mobility of mesenteric cysts, the same is dependent upon their situation in the mesentery. Thus if small and situated close to the intestine, mobility would be marked, while if located in the mesentery close to its parietal attachment, or if it is large enough to have split the mesentery down to its parietal attachment, it must have a limited range of mobility. The size of the cyst necessary to bring about such limitation of motion would, of course, depend upon the length of the mesentery involved. Percussion eliciting an area of dullness, completely surrounded by intestinal resonance after the intestines are distended with gas, is characteristic of mesenteric and intestinal cysts, and will greatly aid in differentiating them from other intra-abdominal growths. The presence of a band of resonance crossing the tumor, due to a portion of distended bowel lying in front of the cyst, as is possible when the cyst is located in the mesentery or in the intestinal wall on its mesenteric side, will materially strengthen the diagnosis, yet this symptom must not be relied upon too implicitly, for a loop of bowel adherent to any intra-abdominal growth might give rise to a similar phenomenon. Aspiration has been suggested as an aid to diagnosis, and while it may clear up some questions, it can only do so by hazarding risks of puncturing overlying bowel. Therefore its use cannot be recommended. The symptoms dependent upon the disturbance of intestinal function

will, of course, vary with the degree and character of such disturbance. Cases so far reported indicate that in the early period of their history no disturbances whatever may exist. Where symptoms do exist prior to the onset of acute abdominal symptoms, they are due to pain in the region occupied by the tumor, which may be reflected to distant areas. This pain may be occasioned by the rapid growth of the cyst or by increased intestinal peristalsis caused by the encroachment upon the lumen of the bowel by the growth. In the latter instance, the pain would be characterized by periodicity, accompanied by increasing constipation, and often associated with vomiting, symptoms indicative of the gradual development of intestinal obstruction. The acute symptoms which may develop are those dependent upon intestinal obstruction, an obstruction which may be due to pressure upon, torsion, or angulation of the intestine by the cyst, or to strangulation from inflammatory bands or the pedicle of pedunculated cysts, or again, by protrusion into the lumen of the intestine of the submucous variety of intestinal cysts.

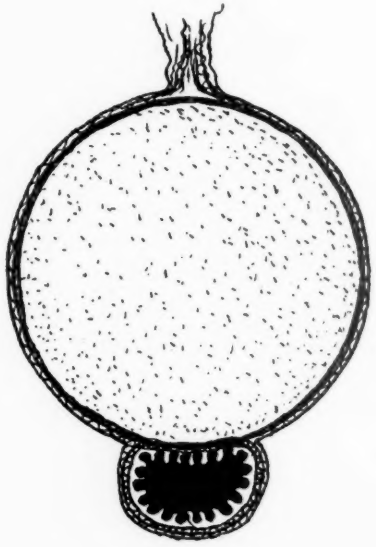

FIGURE 7.—Drawing, illustrative of relation of cyst to bowel and mesentery, transverse section.

Degenerative and inflammatory changes in the cyst leading to involvement of the peritoneum are also to be considered as possible contributing factors to the quota of symptoms.

### PROGNOSIS

While intestinal and mesenteric cysts must be looked upon as primarily innocent, yet a tendency exists, with but few exceptions, to the development of conditions inimical to the health and life of the patient. Upon their character, size, and situation, referable to the intestinal tract, will depend largely the development of such conditions.

Among conditions tending to a fatal result may be mentioned as foremost—

First. Intestinal obstruction from pressure upon the bowel by the growth. (Sutherland and Frankel.)

(*a*) Angulation through traction of growth on bowel to which it is attached. (Buchwald.)

(*b*) Torsion of the intestine. (Quensel and Gfeller.)

(*c*) Invagination in submucous variety. (Sprengel.)

(*d*) Adhesions or bands. (Moynihan.)

Second. Peritonitis.

(*a*) From torsion of pedunculated forms.

(*b*) Infection of cyst through communication with the lumen of the bowel.

Third. Secondary changes in cyst.

(*a*) Adenomatous growth in dermoids. (Heuter and Anderson.)

(*b*) Sarcomatous growth. (Quensel.)

(*c*) Tuberculosis. (Quensel.)

### TREATMENT

There can hardly exist a difference of opinion in the mind of surgeons as to the advisability of operative interference in these cases. While it may be admitted that in some instances the sterile hydatid cyst as well as lymphatic and the hemorrhagic cysts of the mesentery may not, in the absence of disturbance of intestinal function, demand operative interference, yet they can hardly be influenced by any other plan of treatment. However, as it is quite impossible to differentiate these cysts from others, such as dermoids, which show a tendency to ultimate development of disturbances demanding their

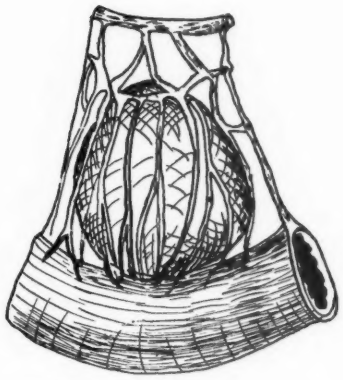

FIGURE 8.—Drawing, illustrative of cyst in mesentery.

immediate removal, it would seem, in the light of our present knowledge, that it might be laid down as a dictum that cysts, suspected of being intestinal or mesenteric, should be exposed and treated in accord with well-recognized principles. It has been advised that the cyst be sutured to the parietal peritoneum and subsequently opened and drained. This plan has been followed in a few instances.

This plan of treatment cannot, however, be commended, excepting in instances where the cyst cannot be well removed. Enucleation of the cyst more clearly meets all surgical indications. Where the cyst is a mesenteric one, the enucleation must be made through an incision in the mesentery parallel with the axis of the mesenteric vessels, care being exercised to injure them as little as possible, in order to avoid the difficulties of hemorrhage, and the danger of intestinal necrosis from their extensive ligation. The plan employed in the case here reported, of draining the cavity into the peritoneal cavity, in order to obviate the danger of disturbing the circulation of that portion of the bowel supplied by the mesentery from which the cyst was removed, is believed to be possessed of some advantages in the management of large mesenteric cysts. Where intestinal obstruction and possible gangrene have occurred in the course of such cysts, then resection of the bowel may be indicated if the condition of the patient warrants. The patient's condition preventing this, the simple opening of the bowel above the seat of obstruction, thus affording an artificial exit for its contents, may be all that can well be undertaken for the time being, leaving the growth to be subsequently removed in the event of the patient's recovery from the obstructive symptoms. When the cyst is situated in the intestinal wall, its enucleation should be attempted, and carried out, if possible, without opening in the intestinal lumen. This, however, will only be possible in the subserous and intramuscular variety.

Incision into the intestinal lumen will, with a few exceptions, become a necessity in the submucous variety. The closure of the intestinal wound after the removal of the cyst is, of course, governed by well-understood principles of intestinal surgery. In some instances, owing to the position and size of the cyst or condition of the bowel, it may be necessary to resect the bowel containing the cyst.

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# ECHINOCOCCUS DISEASE OF THE HEART, WITH A REPORT OF A CASE [1]

(From the wards of Cook County Hospital, Chicago)

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So far as I am able to discover, no case of echinococcus disease of the heart has previously been reported in this country, and only one case of echinococcus cyst in the pericardium (Allaben). As rare as echinococcus disease is in the United States, there have recently occurred at least four cases in Chicago. Dr. Schroeder presented to the Chicago Surgical Society a case of generalized echinococcus disease of the peritoneal cavity, and Dr. Miller informs me that within the past few years there have been at the Presbyterian Hospital three patients who have expectorated hooklets, or portions of the cell membrane, or both.

Lizzie P., twenty-seven years old, entered Cook County Hospital April 2, 1905, in the service of Dr. Miller. She was a native of Italy, from which country she had emigrated the previous year. She could talk no English, and, as a consequence, the history of the case is very imperfect. We learned, however, that she had been troubled for four months with cough, pain in chest, and an abundant expectoration, which at times had been bloody. She complained of nausea and vomiting, and had lost forty pounds in weight. Examination showed a much-emaciated young woman who could not speak above a whisper, and whose facial expression was that of fear, the eyes being wild and staring. Tongue, dry and fissured. Heart, on percussion, showed dullness from the right border of the sternum to three-fourths inch to the left of the nipple-line, and above as high as the third rib. At the apex a loud, rough systolic murmur was heard, while over the pulmonic area there was also a loud systolic murmur. The lungs showed dullness anteriorly and posteriorly over the right upper lobe, with some dullness posteriorly over the left upper lobe. Low down posteriorly, just to the right of the vertebral column, was a small area, about the size of the palm, over which the percussion note was somewhat tympanitic. On auscultation, moist rales and bronchial breathing were heard over the right upper lobe, and a few mucous rales over the middle lobe; some bronchial breathing was heard over the left apex, and a few moist rales in the left axillary region. In the abdomen was felt a pregnant uterus reaching to the umbilicus, fetal movements being observed. Vaginal examination showed the usual signs of pregnancy.

From the lung-findings a diagnosis of pulmonary tuberculosis was made, which examination of the sputum confirmed. During her stay in the hospital her cough was very violent, and she expectorated large quantities of purulent material. Only once did her temperature rise above 99 degrees Fahrenheit, and at that time was only 99.6 degrees Fahrenheit. Her pulse ranged from 96 to 128. The most noticeable symptom was the extreme dyspnœa. Once her respirations were only twenty to the minute, but this was only for a short time, most of the time the respirations being from forty to sixty per minute. In order to get sufficient air, the patient was compelled to sit up in bed, and then her breathing was very labored. On the fifth of April the patient coughed up a small cyst, about one centimeter in diameter. This was unruptured, and showed what seemed to be sub-cysts. The fluid of this cyst failed to show any hooklets, but a large number of small round bodies found within the echinococcus embryo were seen. The wall of the cyst showed the characteristic laminated appearance. After this the sputum was examined several times for hooklets, but without success. On the morning of the 10th the blood showed 2,886,000 red-blood corpuscles, 19,000 white-blood corpuscles, of which 88.3 per cent were polymorphonuclears, 7.8 per cent large mononuclears, 3.9 per cent small mononuclears, no eosinophiles, hemoglobin 80 per cent (Talquist). The patient died suddenly at six o'clock p. m., the evening of the 10th, and immediately afterward the child was delivered through a median abdomina incision. Child breathed once or twice, and then died in spite of all efforts to revive it.

On the morning of the twelfth an autopsy was held. It was not permitted to open the cranial cavity. Thorax: No fluid was found in the pleural cavities; the left was free from adhesions, but the right apex was firmly adherent to the thoracic wall. Throughout both lungs could be palpated rounded masses, some nearly as large as hen's eggs. The left lung crepitated throughout, but the right upper lobe was almost solid, and in the middle and lower lobes could be felt hard, shot-like bodies, irregular in outline. On section the left lung showed several large echinococcus cysts throughout both lobes, varying in size from that of a pea to that of a hen's egg. No focus of tuberculosis was found in either lobe. The right lung, on section, showed practically the same distribution of echinococcus cysts,—if anything, the number being slightly greater. The entire right upper lobe had a honey-combed appearance, more marked in the upper than in the lower portions, and gave off a

[1] Case reported before the Chicago Medical Society, May 24, 1905.

caseo-purulent material. Disseminated tuberculosis existed in the middle and lower lobe. The area of tympany previously described was found to be just below a large cyst located in the upper posterior portion of the right lower lobe. This sign is considered characteristic by Behr. This cyst was removed without rupturing. Examination of the fluid showed the absence of albumen and sugar and the presence of a large amount of sodium chloride. Microscopically, the fluid contained many proligerous vesicles, in which the characteristic echinococcus embryos could be seen. The wall had the characteristic laminated appearance, and on its internal surface were seen numerous daughter cysts. In removing the cyst the fingers became covered with a thick, viscid material, the pericystic fluid. The lung tissue surrounding the pericystic cavity showed a thin connective tissue layer, in which there were numerous small blood-vessels. Some of the larger cysts in the right lung had become infected, the cystic fluid being purulent. A smear of this fluid showed a pure culture of streptococcus. Several of the cysts connected directly with a pulmonary vessel, showing that the infection was by way of the blood. In the lung substance numerous typical tubercles were seen. The central portions of the lungs were nearly free from cysts, most of the latter occurring peripherally in the lung substance or just beneath the pleura. The peribronchial lymph-glands showed caseous and calcareous degeneration. On examination the heart was found to be free from change, except for the presence of a cyst the size of a pigeon's egg, in the posterior wall of the right auricle. This cyst had ruptured internally, and a clot was found adherent to its endocardial opening. When this clot was removed, several daughter cysts, varying in size from a pinhead to a pea, escaped into the cavity. The walls of this cyst seemed drier and harder than those of the lung. A section through the cyst and heart walls showed that the musculature of the latter had undergone no appreciable change, but there was a thin layer of fibrous tissue between this and the cyst-wall. The stomach and intestines were not removed, but careful external examination failed to show any trace of echinococcus. The spleen showed no change. In the kidneys was observed a slight degree of chronic parenchymatous degeneration. The uterus showed the characteristics of the pregnant uterus at six months, the placenta being attached to its posterior wall. No trace of echinococcus disease was seen in other organs than the heart and lungs.

The case is probably one of primary echinococcus disease of the heart, with secondary infection of the lungs. This is suggested—(1) by the diffuse infection of the latter, (2) by the peripheral location of the cysts in the lungs, (3) by the intimate connection of certain of the cysts with pulmonary vessels, (4) by the presence of daughter cysts in the cyst in the right auricle, and (5) by the fact that the pulmonary tuberculosis was all on the right side, while the echinococcus cysts were about equally distributed between the two lungs.

The location of echinococcus cyst in the heart is of rare occurrence. In 1846 Griesinger was able to collect but fifteen cases, and in 1868 Oesterlen only twenty-one. There have been previously reported in literature, so far as we have been able to determine, but fifty-five cases, including those of echinococcus disease of the pericardium.[1]

*Etiology.*—Of the fifty-five cases, males were affected twenty-six times, females nineteen times, while in eleven the sex was not mentioned. The somewhat more frequent occurrence in males is rather noticeable, since the same disease of the lung is found to be slightly more frequent in women than in men. The disease has occurred at any age, from seven years (Case XLVII) to seventy-three years (Case LIV). The most frequent age at which the cysts have been discovered is between fifteen and twenty-five years, at which time 41 per cent of those cases in which age is mentioned occurred.

In reviewing the cases the frequent mention of drunkenness is striking, as is also the number of times which the affection has occurred in soldiers. The reports, as a rule, were so meager in respect to nationality and habits that it is very hard to draw any conclusion as to these important etiological factors.

*Pathogenesis.*—We here have to deal with two distinct classes of cases, the one where the heart is alone or primarily involved, the second where its involvement is secondary to that of some other organ, especially the liver.

As to the second class of cases it is easily seen that from any part of the body a daughter cyst might make its way into the general or pulmonary circulation, and in due time become lodged in the heart, there remaining as a foreign body in the blood-stream, or becoming attached to the wall and growing in that position. For the first class of cases, we may recognize two possible general routes of infection: (1) by the blood-stream, and (2) by the lymphatics. It has always been taken for granted that the echinococcus embryo

[1] Morgagin's case is rejected on authority of Peacock.

Heart opened, showing hydated cyst.

was hatched only in the mucosa of the stomach, and from there carried to other organs in which it might develop. That direct infection of the heart may possibly occur in this manner without infection of the liver is probably true, since, as Behr[1] states, measurement has shown that the hooklets will pass through the dilated capillaries of the liver, and that it is conceivable for the embryo to pass through in like manner. It would seem possible that the egg might lodge higher up in the alimentary canal, as in the œsophagus or even the pharynx, or on the tonsils, where, the embryo having been formed, it would be introduced into the blood (either artery or vein) or lymphatic stream. Once in the lymphatic stream, it might be carried into the thoracic duct, though it is extremely doubtful if the echinococcus embryo can travel in such narrow passages as the lymphatic vessels. That the embryo may pass through the capillaries of the liver without infecting that organ, and finally lodge in the heart, is entirely possible, but it would seem more plausible that the egg should be hatched higher up in the alimentary tract, and the embryo from there escape to the heart.

*Pathology.*—Of the fifty-six cases, in fifteen, as definitely stated, the heart alone was affected, while the impression in the twenty-four cases in which the report was not complete is, that in the majority of them the heart only was involved. Other organs were affected as follows:

| | | |
|---|---|---|
| General Infection | 1 | (XXVI). |
| Liver | 7 | (V, XXXIII, XL, XLV, XLVII, LV). |
| Liver and Lungs | 1 | (XXII). |
| Lungs (both) | 3 | (XXIV, LII, and case here reported). |
| Lungs (left) | 3 | (XVI, XIX, XXXVIII). |
| Spleen | 1 | (XXXIX). |
| Left Ovary | 1 | (X). |
| Right Femoral Artery | 1 | (XXI). |
| Pulmonary Artery | 1 | (XXIII). |
| Abdominal Cavity | 1 | (XLII). |

These statistics would show that at least 27 per cent of the cases involve the heart alone, and that only a small proportion of them are secondary to infection of the liver. All the cases in which the lungs were affected showed the lesion to be in the right heart, which makes it much more probable that the lungs were affected either at the same time as that organ, or, what is more likely, secondary to it.

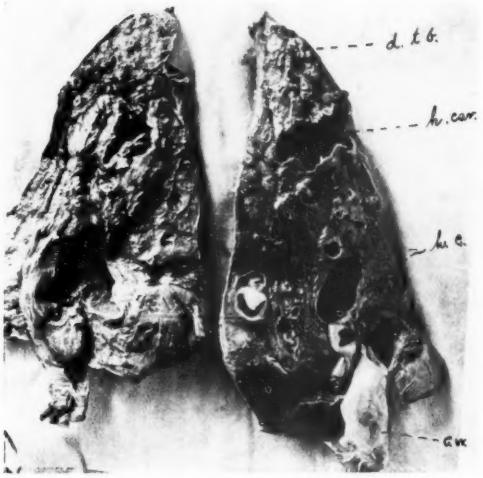
The location of the cysts in the heart was rather varied, as the following table will show:

| | |
|---|---|
| Right Auricle | 7 |
| Right Ventricle | 15 |
| Right Auricle and Ventricle | 2 |
| Left Auricle | 2 |
| Left Ventricle | 14 |
| Left Auricle and Ventricle | 1 |
| Both Ventricles | 5 |
| Both Auricles and Ventricles | 1 |
| Pericardium | 4 |
| Left Ventricle and Pericardium | 1 |
| Not classified | 4 |

It will be seen from this table that the right heart was involved twenty-four times, while the left heart was involved but seventeen. However, of the twenty-four cases in which the lesion was confined to the right heart, thirteen showed disease in the other organs, while in the involvement of the left heart, other organs were involved but four times. These facts would lead one to believe that, taken all in all, primary echinococcus disease of the heart occurs with about equal frequency on the two sides, but that secondary involvement is much more frequent in the right half.

Oesterlen divides the echinococcus cysts of the heart into three classes: (1) those where the cyst is imbedded in the wall, either wholly or partially; (2) where the cysts are found free

[1] Behr: Thèse de Paris, 1895.




Cross-section of lung.

(*d. tb.*)—Degenerated tubercles.
(*h. cav*).—Hydatid cavity.
(*h. c.*)—Hydatid cyst.
(*c. w.*)—Cyst-wall.

in the heart cavity; (3) where the cysts are found at the end of pedicles or stalks projecting into the auricles or ventricles. Of these three classes, the first gives by far the most numerous cases, forty-seven in all, and of these only eight are spoken of as being imbedded entirely in the wall.

In the second class are only three cases (V, XIII, XXII). Of these, two (V and XXII) were secondary to cyst of the liver, while it is especially stated in the other case that the heart only was involved.[1]

Only two cases are reported which represent the third class (VII, XXXI). These existed as small cysts attached by long, solid pedicles to the valves. The manner in which these occur is doubtful, but it is likely that the echinococcus embryo is first located just beneath the endocardium, and that as it grows it offers more and more resistance to the blood-current, which latter stretches more and more the thin connection between the cyst and the valve.

Four cysts occurred in the pericardium, and are not included in this classification.

[1] Omitted from this class are all cases where a cyst of the heart itself has ruptured, and daughter cysts been found in the heart's cavity.

The size of echinococcus cyst of the heart is very variable, from that of a cherry to that of an orange, the usual size being 3-4 cm. in diameter.

In the cases where the cysts were found free in the heart cavities, many cysts were present. In one case (VII) of the pedicled cysts, 70–80 were found. In over 70 per cent, however, the heart showed only one cyst.

As a rule, the heart-wall shows little reaction to the cyst, other than the connective tissue envelope which might be found about any foreign body. However, in rare cases the tissue surrounding the cyst has been found to be of cartilaginous consistency, and to remain as a cup after the cyst has been dislodged. In some cases the pericystic cavity (and from this the cyst itself) has become infected from a pericarditis or an endocarditis. In one or two instances the cysts seem to have shown some tendency to absorption and cicatrization. The usual result is rupture and the filling of the cavity or large blood-vessels with daughter cysts.

Very noticeable is the frequent occurrence of pericarditis (25 per cent). In two-thirds of the cases this was either an adherent pericardium or adhesive bands.

Involvement of other organs secondary to the heart is probably largely confined to the lungs. The reason why this does not occur oftener is that after the rupture of the main cyst the daughter cysts are large enough to stop the valves of the heart or large vessels, and death occurs at once.

*Symptoms.*—Nothing is distinctive about the involvement of the heart in echinococcus disease. The usual signs of broken compensation are often present. In 35 per cent of the cases death came suddenly without previous warning, following sudden exertion, and the autopsy showed a ruptured cyst with the daughter cysts plugging the valves of the heart or arteries, or else a large cyst itself had become loosened and had served the same purpose.

*Diagnosis.*—In only one case (LV) was the condition even hinted at. The occurrence of echinococcus disease elsewhere, together with signs of broken compensation of the heart, might lead to a suspicion of disease in the organ. The use of the fluoroscope might lend some aid, but with our present means of diagnosis the recog-

nition of this condition would be extremely difficult.

*Prognosis.*—In nearly all cases death was due to the presence of the disease in the heart. In a few cases only did the presence of an echinococcus cyst fail to offer a strong cause for death. In rare cases, such as Case LIV, the patient may reach advanced age without inconvenience, but as a rule the growth of a cyst would seem to be rapid and to lead to death in a few years.

*Treatment.*—Practically, no treatment is of any avail. Heart-stimulation would cause tronger contractions of the heart-muscle, and might bring about rupture of the cyst. Where the cyst is located in the pericardium, or on the external surface of the heart, surgical intervention might be thought of, but from several of the reports it will be seen that these cases do not stand an anæsthetic well.

I wish to thank Dr. J. L. Miller for his assistance and for his permission to report the case, and Dr. Norcross for furnishing me with the microscopical report.

## CASE REPORTS

I

PRICE, D. "Case of sudden death, in which a hydatid was found in the substance of the heart." Med. Chir. Tr. Lond., 1821, XI, 274–276. In a poor English boy 10 years of age a large hydatid was found in the "muscular substance of the heart." Death sudden.

II

EVANS, H. R. "Case in which a cyst containing hydatids was found in the substance of the heart." Med. Chir. Tr. Lond., 1832, XVII, 507–511. In an Englishwoman 40 years of age, an echinococcus cyst, 3 inches in diameter, was found in the apex of the right ventricle. Slight pericarditis complicated. No mention is made of examination of other organs. Symptoms were those of severe dyspnœa, with collapse.

III

WILLIAMS. "Hydatiden in dem Herzen eines Kindes." Schmidt's Jahrb., 1836, IX, 29. In a young girl. Three large hydatids in the left ventricle. Hydrothorax. Symptoms were those of cardiac insufficiency. Patient died after a lingering illness.

IV

SMITH. "Hydatids of the heart." Lancet, Lond., 1837–38, II, 628. In a woman. Large hydatid in the right ventricle, which contained daughter cysts. Symptoms were those of acute cardiac insufficiency. Death sudden.

V

VINES. "Heart filled with hydatids floating in its cavity." Med. Times, Lond., 1845–46, XIII, 28. Pathologic specimen of a large hydatid cyst of the liver, the right ventricle being filled with floating hydatides.

VI

GRIESINGER, W. "Ueber; Acephalocysten am Herzen." Arch. f. physiol. Hilk. Stuttg. 1846, V, 280–287. In a woman 37 years old. A ruptured cyst the size of a large nut was found in the wall of the right ventricle.

VII

OTTO. (1) See Griesinger. Seventy or eighty hydatids the size of cherry-stones suspended on long solid pedicles were found in the right auricle attached to the Eustachian valves.

VIII

OTTO. (2) See Griesinger. In a wine-drinker (male) 33 years old. Cyst in pericardium.

IX

MECKEL. See Griesinger. In a man aged 50 years. In the outer surface of the left heart was an echinococcus cyst the size of a hen's egg.

X

RÜTTY. See Griesinger. In a female of 23 years. An echinococcus cyst was found on the inner surface of the right ventricle. Also one in left ovary.

XI

CLOSSIUS. See Griesinger. In a female of 26 years. An echinococcus cyst was found in the right auricle.

XII

WARD, N. "Acephalocyst in the substance of the heart." Tr. Path. Soc. Lond., 1848–50, I, 225. In a male of 22 years, a drunkard. A cyst size of a French walnut, containing daughter cysts, found in left ventricle. Extensive aortic and mitral disease and cirrhosis of the liver. Brain not examined. No cysts in other organs.

XIII

MORENS, J. "Inosperada, aparacion de un estado de ansiedad y dificultad en la respiracion, seguido de la muerta a la hora y media; autopsia; quistos hidatidicos en la ventriculo derecho del corazon." Gac. Med., Madrid, 1849, V, 35. Young cavalryman, in the fourth day of his convalescence from a second attack of pneumonia, suddenly showed marked signs of cardiac failure and collapse, and died in one and one-half hours. Autopsy showed a large number of hydatid cysts free in right ventricle. Size of these varied from that of a hemp-seed to that of a large walnut. There was no involvement of the other organs.

XIV

COOTE, H. "Hydatid cyst imbedded in the anterior wall of the left ventricle of the heart." Med. Times & Gaz. Lond., 1854, VIII, 156. In an anatomical

subject, a cyst three-fourths inch in diameter was found situated on the anterior wall of the left ventricle. Adhesive pericarditis. Examination of other organs not mentioned.

XV

HABERSOHN. "Hydatids in the pericardium; adherent pericardium." Tr. Path. Soc. Lond., 1854–55, VI, 108. In a female 16 years of age. In the pericardium over the anterior aspect of the heart was found a cyst 2½ inches by 1 inch in size, which contained numerous daughter cysts. This encroached upon the right auricle and ventricle. Pericardium universally adherent. No other organs involved. Patient complained of dyspnœa and had a loud systolic bruit over the pericardium.

XVI

BUDD, G. "An hydatid tumor in the apex of the right ventricle of the heart and free hydatids in the branches of the pulmonary artery." Med. Times & Gaz. Lond., 1858, XVII, 54–56: Abstr. Tr. Path. Soc. Lond., 1858–59, 80–83. In a female of 23 years. In the apex of the right ventricle was an echinococcus cyst the size of an orange. Free cysts were found beneath the tricuspid valve and above the pulmonary valve in the pulmonary artery. In the branches of the pulmonary artery of the left lung were found small hydatids. Fatty liver. No other abnormalities. Symptoms were those of broken compensation with a rasping systolic murmur over the base, not widely transmitted, and disappearing about four months before death.

XVII

WILKS. "Loose hydatids in the heart." Tr. Path. Soc. Lond., 1859–60, XI, 71. In a woman 19 years old. At the apex of the left ventricle in a cartilaginous envelope which contained no muscular tissue was an echinococcus cyst the size of a billiard-ball. Small cyst about the same size in liver. Other organs not involved. Death sudden.

XVIII

LÖWENHARDT. "Ein Fall von Echinococcus des Herzens." Allg. Zeitschr f. Psychiatrie, 1865, XXII, 125. In a woman aged 20 years. In the right heart were two cysts, each the size of a hen's egg, and each containing daughter cysts. A large cyst was present in the right auricle. Fatty degeneration of the heart-muscle and slight chronic pericarditis. Sudden death.

XIX

ROSI, L. "Del echinococcus del pulmone e del cuore; storia e necropsia." Sperimentale, Firenze, 1866, XVII, 332–337. In a man thirty years old. In the septum of the right ventricle were two tumors, the smaller contained daughter cysts, the larger sebaceous material. Pericardium was inflamed and contained much fluid. Left pleura was inflamed and the left lower lobe hepatized. The latter contained two hydatid cysts, one being superficial and about the size of a walnut. Right lung normal. Patient had coughed up hydatids and portions of membrane. Unusual murmur over heart and signs of cardiac insufficiency.

XX

BARCLAY, J. "Case of hydatids of the heart and lungs." Glasgow, M. J., 1866–67 ns, I, 426–431; Abstr. Jahresbericht f. Med., 1867, II, 310. In a man 26 years old. A cyst had ruptured in the right heart, leaving it filled with daughter cysts of various sizes. Death from pneumonia.

XXI

OESTERLEN. "Ueber Echinococcus in Herzen." Arch. f. Path. Anat. etc., Berl., 1868, XLII, 404–418. In a woman of Würtemberg, aged 23 years. In the posterior wall of the left ventricle was a ruptured echinococcus cyst 3.6 cm. by 2.5 cm. In the right femoral artery was an embolus consisting of an echinococcus cyst which had caused gangrene. Patient died of sepsis following amputation.

XXII

V. LUSCHKA. See Oesterlen. In a woman aged 45 years. An echinococcus cyst of the liver had ruptured into the inferior vena cava, and the cavities of the heart contained free hydatids. Lungs were involved from the heart.

XXIII

KELLY, C. "Hydatid cyst in the heart." Tr. Path. Soc. Lond., 1869, XX, 145–148. In an English printer's boy aged 10 years. In the right auricle, originally from the appendix auricle, was a sac containing multiple cysts. The largest of these was the size of a walnut, and plugged the tricuspid orifice. In the main branch of each pulmonary artery was an oval hydatid which was adherent to the vessel-wall. The writer thinks that the cyst in the heart and the pulmonary emboli were synchronous. The pericardium was slightly adherent to the right auricle by fibrous bands. Death sudden.

XXIV

DUCASTEL. "Hydatides du cœur et des poumons." Bull. Soc. Anat. de Paris, 1870, XLV, 362–365. In a French soldier aged 25 years. In the right ventricle impinging on the pulmonary artery, were found a dozen small echinococcus cysts. The largest of these was the size of a pigeon's egg. Lungs showed disseminated echinococcus disease. Patient had expectorated some blood and echinococcus membranes. A systolic murmur was heard over the base of the heart, a diastolic at the apex, and some hypertrophy was noticed.

XXV

MOXON, W. "Hydatid of the heart. obliterating by its presence the coronary sinus." Tr. Path. Soc. Lond., 1870, XXI, 99. In a man aged 19 years. An echinococcus the size of an apple "rose back off the auricles, off their septum, near where it joins the septum of the ventricles," implicating both auricles and ventricles. The coronary sinus was totally

closed, and the pericardium adherent. Symptoms were those of mitral regurgitation with broken compensation.

XXVI

PEACOCK, T. B. "Hydatid cyst imbedded in the walls of the heart." Tr. Path. Soc. Lond., 1873, XXIV, 37. In an Englishman aged 38 years, who had lived in Australia and India. A hydatid the size of an orange was found on the posterior wall, projecting on each side of the septum into the ventricles. The cyst was intact and contained daughter cysts. Fibrinous pericarditis. Numerous hydatids in the lungs, liver, spleen, omentum, and right kidney. Patient had expectorated portions of cysts during life. Complained of slight dyspnœa twelve months previous to death. Death sudden.

XXVII

GOODHART, J. F. "Cured hydatid cyst in the wall of the heart." Tr. Path. Soc. Lond., 1876, XXVII, 72. In a man 20 years old, who had evidently been employed around animals. In the anterior wall of the left ventricle and the septum between the ventricles was an old echinococcus cyst the size of a Tangerine orange, around which was an area of suppuration. Adhesive pericarditis. Sudden death.

XXVIII

DUPUYTREN. See Peacock. "Adventitious products in the heart." Syst. Med. (Reynolds) Lond., 1877, IV, 165–181. Found in a cadaver of a woman aged 40 years. Cyst in right auricle, with free cysts in auricular cavity.

XXIX

TROTTER. See Peacock. In boy 14 years. A large cyst was found in the right auricle and two smaller ones in the right ventricle. Symptoms those of cardiac insufficiency.

XXX

ANDRAL. (1) See Peacock. Tumor size of walnut in left ventricle.

XXXI

ANDRAL. (2) See Peacock. Cyst size of nut was attached by a small pedicle to the lining membrane of the right ventricle.

XXXII

ROKITANSKY. (1) See Peacock. In a woman aged 23 years. A tumor the size of a hen's egg was found in the interventricular septum, and protruding into both ventricles. This had ruptured on the right side and obstructed the pulmonary artery. Sudden death.

XXXIII

ROKITANSKY. (2) See Peacock. In a man of 25 years. A cyst the size of a duck's egg was found in the upper part of the septum and the corresponding portion of the left ventricle behind. Pericardium adherent at seat of tumor. Three separate cysts in liver. Sudden death.

XXXIV

ARAN. See Peacock. In woman aged 23 years A cyst in the left auricle, which had burst on both sides. Patient died suddenly after confinement.

XXXV

METTENHEIMER, C. "Ein Fall von Echinococcus des Herzens." Memorabilien, Heilbr., 1877, XXII, 337–344. In a German soldier aged 35 years. Three cysts in musculature of left ventricle size of cherries, one of which contained echinococci. Also one in right ventricle. No other organs showed echinococcus disease. Patient had pneumonia and epilepsy.

XXXVI

GUGLIELMI. "Deux kystes a echinocoques houres dans la ventricule gauche d'une indigene." J. de med. et pharm. de 18 Algerie, Alger., 1877, I, 92. In a woman of 50 years. Two echinococcus cysts, one the size of a nut, and one of a kidney-bean, filled the left ventricle.

XXXVII

MASCHKA. "Verdachteiner Verigiftung; naturlicher Tod; Echinococcus des Herzens." Prag. Med. Wchnschr., 1880, V, 495; Abstr. Jahresbericht f. Med., 1880; L. 665. In a woman were found three large cysts in the left side of the heart, one of which had ruptured through the pulmonary artery. Sudden death suggested poisoning.

XXXVIII

ARNOULD, J. "Kyste hydatique du cœur." Bull. Med. du nord, Lille, 1881, XX, 475–483: Abstr. Rev. Sci. Med., 1882, XIX, 576. In a soldier 21 years old. Cyst in the right auricle, which had ruptured into right ventricle, which latter contained hydatids. Three hydatid cysts in the apex of the left lung. Pulmonary artery filled with hydatids. No cysts in liver or spleen. Adherent pericarditis, attacks of syncope, and urticaria. Death sudden.

XXXIX

RENAULT. See Demantke. An echinococcus cyst at the left side of the apex in the wall of the left ventricle. Also one in spleen.

XL

KNIGHT. "Hydatid cyst of the heart, causing sudden death by its rupture." Liverpool M. Chir. J., 1886, VI, 231. In a man 42 years old. A cyst the size of a walnut found in the right ventricle. Also a cyst the size of a large orange in the liver. Sudden death.

XLI

MARTIN, DURR. See Demantke. A cyst in the anterior wall of the left ventricle. No other organs involved.

XLII

ALLABEN. "Hydatid tumors—a report of a case with post-mortem examination." N. Am. Pract., 1891, III, 612–617. In a German woman 52 years old. The pericardium at the base of the left

ventricle contained several cysts, one the size of a hickory-nut. One cyst was free in the pericardial cavity. Pericardium adherent in places. Six cysts in abdominal cavity and cysts in omentum. One cyst adherent to diaphragm and lung on right side. Several years before the patient had had an abdominal tumor removed and soon afterward had passed cysts per rectum.

XLIII

DEMANTKE, G. "Kyste hydatique du cœur." Bull. Soc. Anat. de Par., 1895, LXX, 122–125. In the anterior and upper wall of the left ventricle was found a cyst the size of a small orange. This contained daughter cysts and hooklets. Pericardium showed slight inflammation. No cysts in other organs. Arrhythmia with systolic murmur at the apex and diastolic at base, together with symptoms of cardiac insufficiency, were noted.

XLIV

LANDOUZY. See Demantke. A cyst in the visceral pericardium on the anterior aspect of the left ventricle. Other organs not involved.

XLV

BOURCERET. See Demantke. A cyst in the interventricular septum impinging especially on the right ventricle. Also a cyst in the liver.

XLVI

RENDU. See Demantke. A cyst in the interventricular septum impinging on both ventricles.

XLVII

MAYET, M. "Kystes hydatiques multiples (foie et cœur)." Bull. Soc. Anat. de Paris, 1895, LXX, 50. In a boy 7 years old, who had lived all his life in Paris. In the left ventricle was a cyst as large as an orange. In the visceral pericardium of the interior extremity of the right ventricle was a small suppurated hydatid. Liver showed multiple cysts. No other organs involved. Boy was operated upon for liver-involvement, and died almost immediately after.

XLVIII

KNAGGS, W. H. E. "Hydatids of the heart." Lancet, Lond., 1896, I, 29. Imbedded in the wall of the left ventricle was a mass of hydatid cysts, in which hooklets were found. No other organs involved. Death sudden.

XLIX

ANDREINI, A. "Caso di echinococco del cuore umano." Bull. d. Soc. rom. per gli stud. zool., Roma, 1897, VI, 227–233. In an Italian soldier 22 or 23 years old. In the left heart was a cyst 7 to 8 cm. in diameter, filled with daughter cysts. Surrounding this was a fibrous capsule one mm. in thickness. Complete adhesive pericarditis. Sudden death after a drinking bout.

L

JAMIESON, S. "Notes on a case of sudden death from rupture of a hydatid cyst into the right auricle." Autralas. M. Gaz., Sydney, 1897, XVI, 598. In a boy 9 years old, whose sister had hydatids of the liver. A ruptured cyst the size of a small orange was found in the right auricle, and a number of unruptured cysts beneath the epicardium. No other organ involved. Death sudden.

LI

GUILLEMARD, B. J. "Hydatid cyst in the heart." So. African M. J., Cape Town, 1897–98, V, 291. In a boy aged fourteen years. An echinococcus cyst was located in the septum between the ventricles and projecting into both. Death sudden.

LII

KLEHMET. "Ueber ein Fall von Echinococcus der Herzmuskels und der Lungen." Centbl. f. Bakt., 1898, XXIII, 422. In a man. A ruptured cyst the size of an apple was found in the right ventricle. The lungs were thick-set with echinococcus cysts, varying in size from that of a walnut to that of a cherry. These contained daughter cysts. The cyst in the heart seemed older than those in the lungs. The symptoms of cardiac insufficiency appeared about four months before death.

LIII

STOENESCU, H. Spitalul, Bucuresci, 1898, XVIII, 169–173. In a boy fifteen years old. A large cyst was found situated in the left ventricle. Other organs not involved. Death sudden.

LIV

OLMER. "Kyste hydatique du cœur chez un veillard arterio sclereux, mort de pneumonie." Marseille Med., 1899, XXXVI, 218. In a day-laborer aged 73 years. An echinococcus cyst the size of of a nut, containing six to eight c.c. of fluid, was found imbedded in the wall of the left ventricle, and adherent to the pericardium. Pneumonia and arteriosclerosis of the aorta with marked involvement of the valves was noted. No cysts in other organs. Death from pneumonia.

LV

CERNE. "Kystes hydatiques multiples du foie; kyste du cœur; mort subite." Normandie Med. Rouen, 1905, XX, 1–5. In a man 24 years old. Operated upon twice for echinococcus cyst of liver. Suspected cyst of the heart because of the weakness and irregular motions of that organ, and the appearance through the fluoroscope. Death occurred very suddenly, five days after the last operation. At autopsy six cysts were found in the liver, which had not been previously treated. The left auricle contained in its muscle a large hydatid cyst. A clot was found filling the left branch of the pulmonary artery.

# THE DIAGNOSIS AND TREATMENT OF SOME SURGICAL DISEASES OF THE URINARY BLADDER[1]

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THE surgical diseases of the urinary bladder considered in this report are selected from a series of 225 cystoscopic examinations, 125 being primary cystoscopies and 100 made in connection with ureteral catheterization. They do not by any means include all the surgical diseases of the bladder. None of the malformations are here considered. This report does, however, represent the more common forms of surgical affections of this organ. I have included ureteral calculi found in the vesical portion of the ureter, which I think may rightly be considered within the scope of this paper. The other conditions include inflammations of the bladder, simple ulcers of the bladder, tubercular ulcers of the bladder, malignant growths, benign growths, and vesical calculi. Most of these cases have been referred to me under the general term of cystitis.

The only method of diagnosis which has been at all reliable, and which in most cases has been absolute, has been the use of the cystoscope. The unreliability of any other method must be apparent to any one who has tried to make a positive diagnosis simply from the pathological elements as found in the urine, for in all the conditions described there are more or less pathological elements to be found, but none of which give any definite clue as to the cause producing it, with perhaps the exception of the tubercle bacilli, which when present would suggest a tubercular infection somewhere in the genito-urinary tract.

The absolute unreliability of the sound as a diagnostic measure is strikingly exemplified in all the cases of vesical calculi. In a number of cases I have myself used the sound preliminary to the cystoscope, but have not been able to make a diagnosis by it. The reason will become apparent by inspection of the cuts showing the location of some of the stones. The cuts shown in this connection have been made from descriptions and records in each case of cystoscopy. The method of keeping records in all cases has been by marking upon the diagrams representing the normal bladder the location and as much as possible the nature of the trouble. (Fig. I.)

There have been very few cases referred to me upon whom I have not been able to use the cystoscope. The contracted and greatly inflamed bladders, especially the tubercular, in which the capacity is not more than one or two ounces, have been very difficult to make a very satisfactory examination of, but such cases have been very few in number. In only a few cases has it been necessary to give a general anesthetic. Very little is to be gained by the use of a general anesthetic. By the aid of cocaine the bladder-capacity can be tested to its utmost; and no general anesthetic, unless given to the danger point, will prevent an irritable bladder from contracting when it is distended beyond the point at which I was able to distend it by the use of cocaine, reflexes being present in the irritable bladder after they have all disappeared elsewhere.

As the diagnosis in most all the cases was made from the appearance of the disease ar seen by the cystoscope, few, if any, of the others symptoms are here considered.

*Simple Inflammations of the Bladder.*—The so-called simple inflammations of the bladder may vary from a small area of inflammation over the trigonum to the deep inflammation with swollen mucosa extending over the entire bladder, as seen in many cases of cystitis. The most frequent causes of the infection are the staphylococcus pyogenes aureus and the gonococcus.

*Simple Ulcers of the Bladder.*— Simple ulcers have been noted a number of times, as in Fig. II, case No. 40. They are diagnosed

[1] Read before the Cleveland Academy of Medicine, May, 1905.

by the shallowness of the ulcer, the tapering margin, and the color of the ulcer, usually being bright red. Case 40a, Fig. III, shows the healing simple ulcer.

*Tubercular Inflammations and Ulcers of the Bladder.*—Tubercular ulcers have often a punched-out appearance, rather sharply defined margins, depressed center, and generally covered over with a yellowish slough. In my own cases the location has been beyond and to the side of the ureteral opening, and generally seen in a group, as Fig. IV, case No. 31, the ureteral opening presenting a pouting and inflammatory appearance.

*Ureteral Calculi in the Vesical Portion of the Ureter.*—I have included here three cases that came under my observation, Nos. 10b, 55, and 109. In two, Nos. 55 and 109, the calculi were seen; in the third case, No. 10b, the diagnosis was made from the bulging in the ureter and the pouting of the ureteral opening, as seen by the cystoscope and shown in Fig. V, also by the inability to introduce a catheter on that side. A few days later, while in the act of

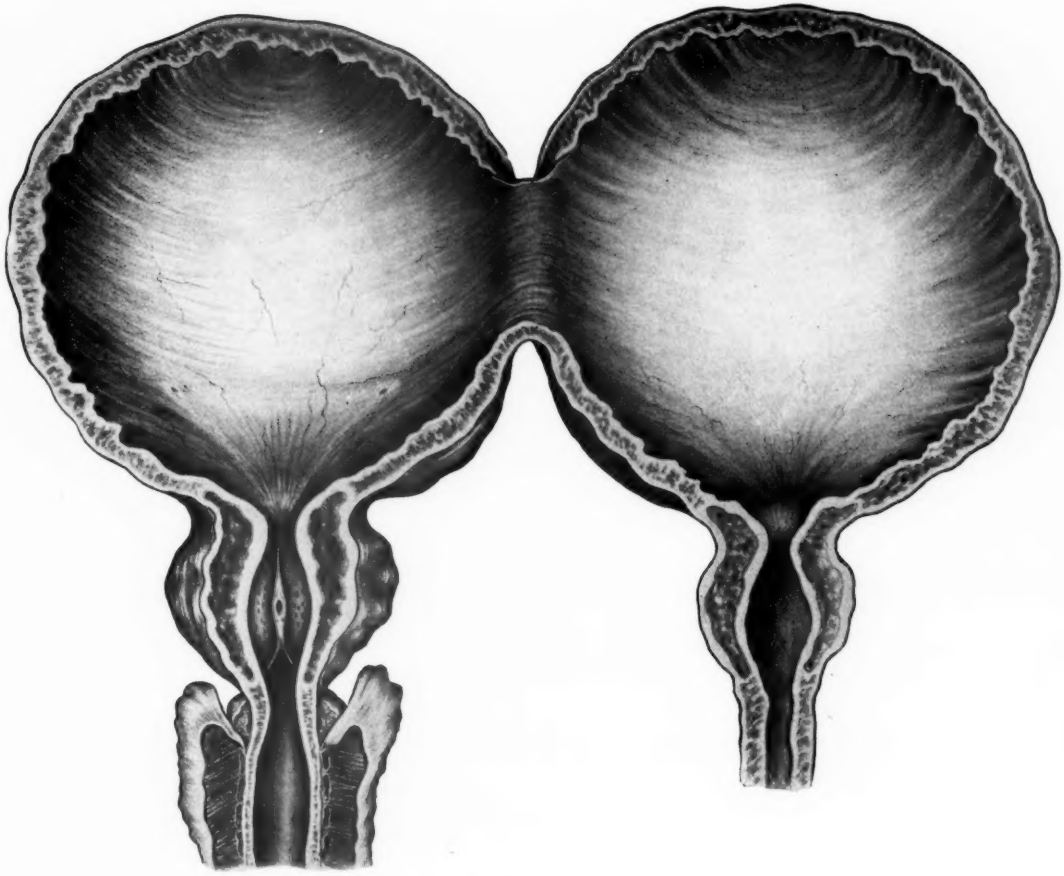

FIGURE I (*a*)

urinating, the patient heard a click in the urinal, which he was sure was a small stone, but he was unable to recover it. However, the pain and distressing symptoms disappeared, and so far, I believe, have not returned.

In case No. 55 the stone could be distinctly seen, with the tip presenting through the ureteral opening, as shown in Fig. VI. The stone was afterward passed. A second cystoscopic examination ten days later showed both ureteral openings clear and normal.

The third case, No. 109, is of more than ordinary interest. After a period of renal colic extending over a considerable time the pain became localized well down in the pelvis. An X-Ray was made by Dr. Henry O. Feiss, and showed a shadow in two different pictures low in the pelvis. A diagnosis of a probable calculus in the vesical portion of the ureter was made. A cystoscopic examination showed the condition found in Fig. VII—a bulging mucosa and very pouting ureteral opening, the other ureteral opening being normal. After several days of large draughts of distilled water the seat of the pain changed to the perineum and along the urethra, especially to the glans penis. A second cystoscopic examination showed both ureteral openings clear, the right slightly larger than the left, evidently due to the dilatation produced by the passing of the stone. Below the ureteral opening on the right side, clinging to the bladder-wall, was a blood-clot, in the center of which was a calculus, Fig. VIII. This was detached by the beak of the cystoscope, and the stone and clot were passed a few minutes later.

FIGURE I (*b*)

*Benign Tumors of the Bladder.* — Benign tumors, particularly the villus papillomata, present a most picturesque appearance as seen by the light. The fine, leafy processes waving

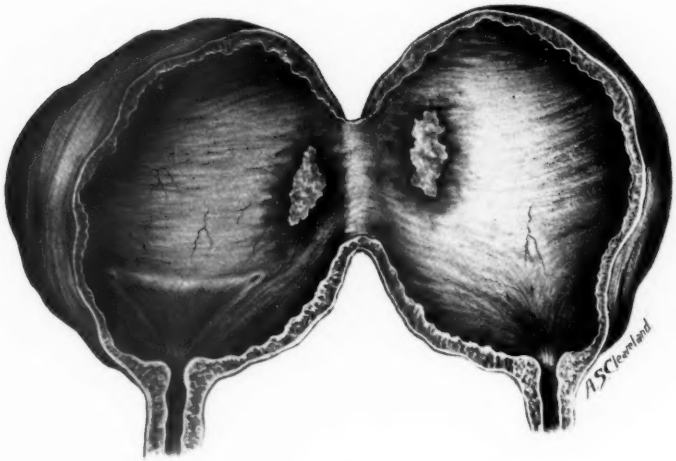

FIGURE II

in the solution cannot be mistaken for any other tumor, Figs. IX and X. Occasionally, however, they simulate more fibrous tumors, have broad bases, and are not easily classified.

mon, and are not very easily recognized by the cystoscope, especially at the commencement of the growth. When ulceration begins, the irregular outline, the granulation appearance,

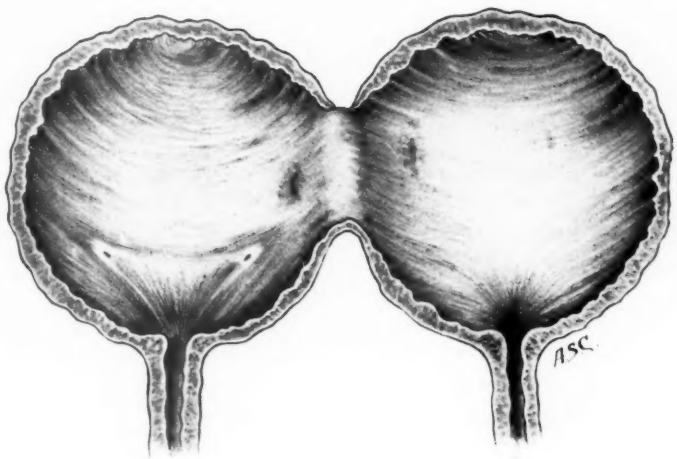

FIGURE III

(See Fig. XI, case No. 28.) Hemorrhage is always a concomitant in this class of tumors.

*Malignant Tumors of the Bladder.*—Malignant growths of the bladder are not very com-

and the bleeding that generally accompanies all malignant ulcers are sufficient to make the diagnosis. (See Figs. XII and XIII, cases 21 and 103.) The growth develops usually very slowly.

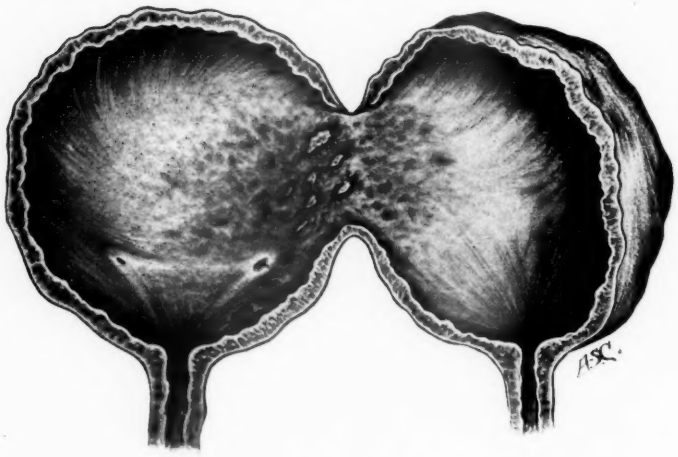

FIGURE IV

and patients, I think, live proportionately longer with malignant growths of the bladder than with involvement of the mucous membranes elsewhere. Malignant tumors adjacent to the bladder, involving the bladder-wall, cause a characteristic bulging of the mucosa—the so-called bullæ.

*Vesical Calculi.*—Vesical calculi are not so very prevalent in this country as compared with some others,—for example, India,— but they do

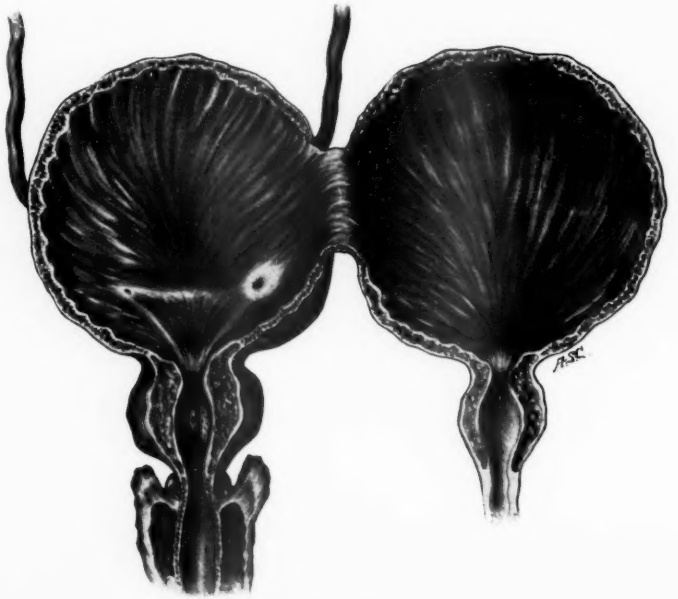

FIGURE V

constitute about five per cent of the cases that I have examined. In none of these cases, as stated before, was a diagnosis made by the aid of the sound. A number were suspected of having s ones, from the classical symptoms, but other conditions beside stone may produce similar symptoms. In several instances stones were found which had not produced any pronounced symptoms, only a slight bladder irritability.

the inability to detect the stones with the sound, as they lay loose in the bladder, as you will see in Fig. XV, case 67, some of them very large. They were probably covered with heavy mucus and did not give the characteristic click.

As a rule, the diagnosis of stone by the cystoscope is quite easy. The only confusion that may occur is in the cases in which the bladder is greatly trabeculated, principally in

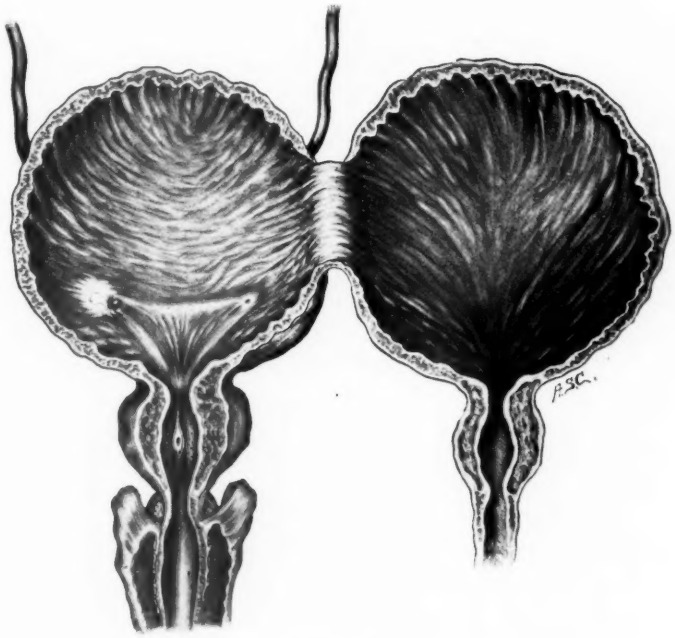

FIGURE VI

The reason for the failure to detect stone was due in some instances to the location of the stone, lying, as shown in Fig. XIV, case 51, well down behind the prostate in a sacculated part of the bladder. In this case there were six stones, and the patient had been sounded repeatedly by a number of physicians, and I had myself sounded him once, but never detected the stone. The cystoscopic examination at once revealed the stones.

In the other cases I can hardly account for

prostatic cases. Here the stone may be buried, or lie in the small pockets and be covered with mucus, so that no definite view can be had of the stone, or the sacculation may contain a mass of mucus and debris which in appearance is not unlike a stone. I had one such case, for which I recommended a suprapubic cystotomy for the relief of retention due to prostatic hypertrophy. At the examination with the cystoscope I discovered a mass in one of the sacculations, which I diagnosed as probably a

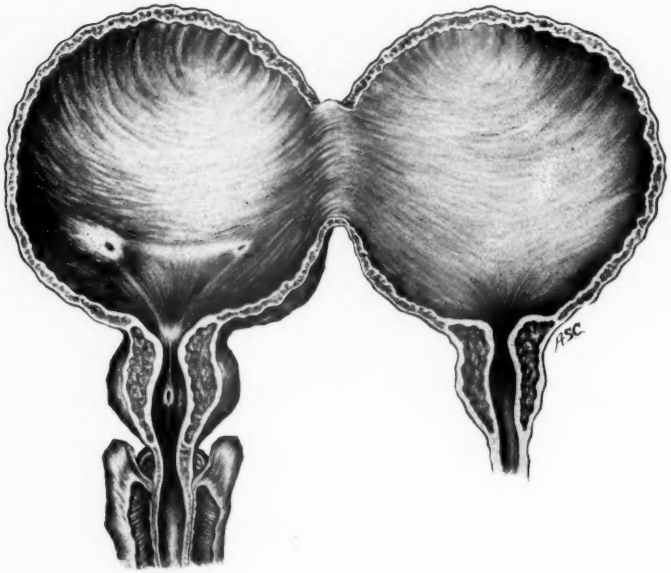


FIGURE VII

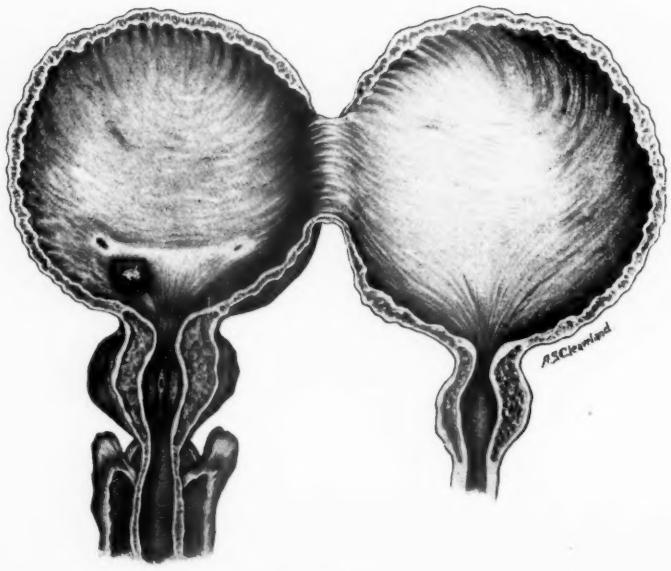


FIGURE VIII

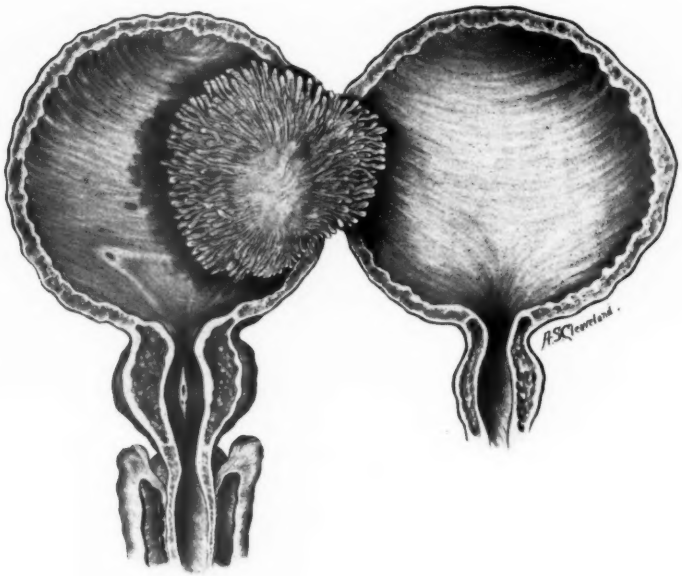

FIGURE IX

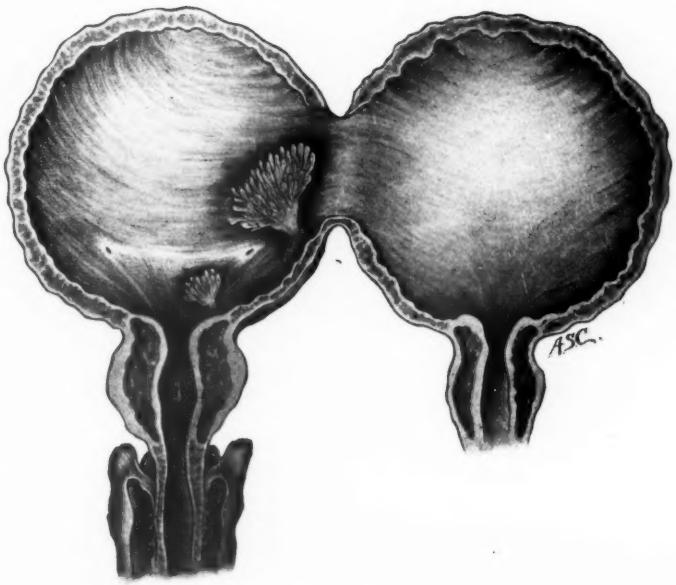

FIGURE X

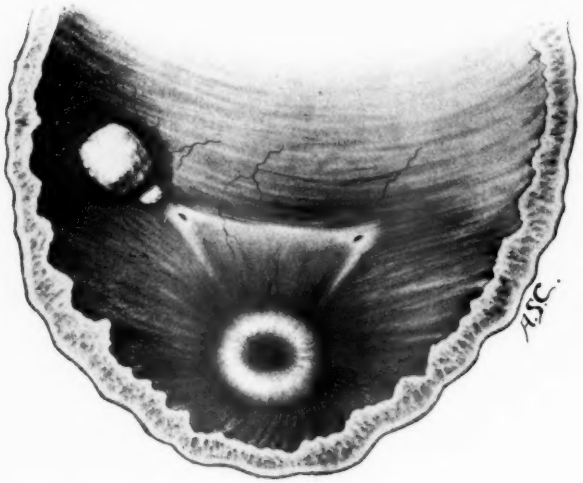

FIGURE XI

stone. It proved, however, to be simply a mass of mucus and pus lying within a small pocket formed in the trabeculated bladder.

*Treatment.*—For the inflammations of the bladder due to the staphylococci or gonococci, caused by stricture or prostatic enlargement, the cause must first be removed. If the inflammation is due to the gonococci, irrigation by some one of the silver preparations has given the best results. I irrigate the bladder without

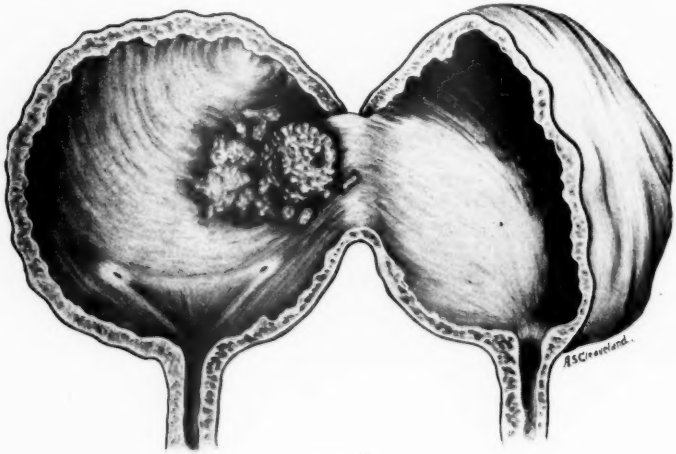

FIGURE XII

large draughts of distilled water, urinary antiseptics, and bladder-irrigation have been the line of treatment. If due to obstruction, or using the catheter. If the sphincter is very irritable or obstinate, a preliminary injection of a two-per-cent solution of cocaine, simply fill-

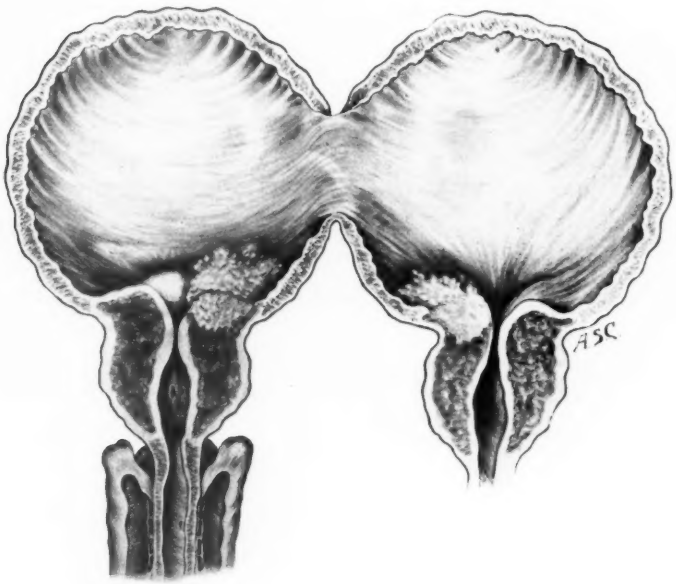


FIGURE XIII

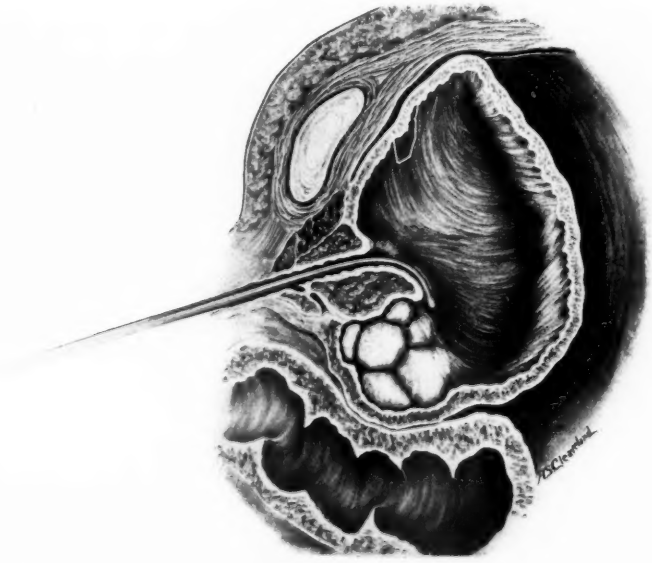

FIGURE XIV

ing the urethra, then as the solution is introduced, the cocaine paves the way. A large 150 c.c. metal syringe with a soft rubber cap I prefer to a fountain syringe or irrigator. It is more convenient, and you can gauge the pressure better.

Some of the simple ulcers have yielded to the same treatment given in the simple inflammations; others have not, and curettage and excision have been necessary in a few cases.

ment. Constitutional treatment and bichlorid of mercury, 1 to 8,000 or 10,000, injected into the bladder seem to give the best results.

The treatment in the three cases of ureteral calculi in the vesical portion of the ureter consisted in giving large draughts of distilled water, and if there was much pain, opium suppositories. Fortunately, it was all that was needed in these cases. It must not, however, be inferred that such treatment will cure all

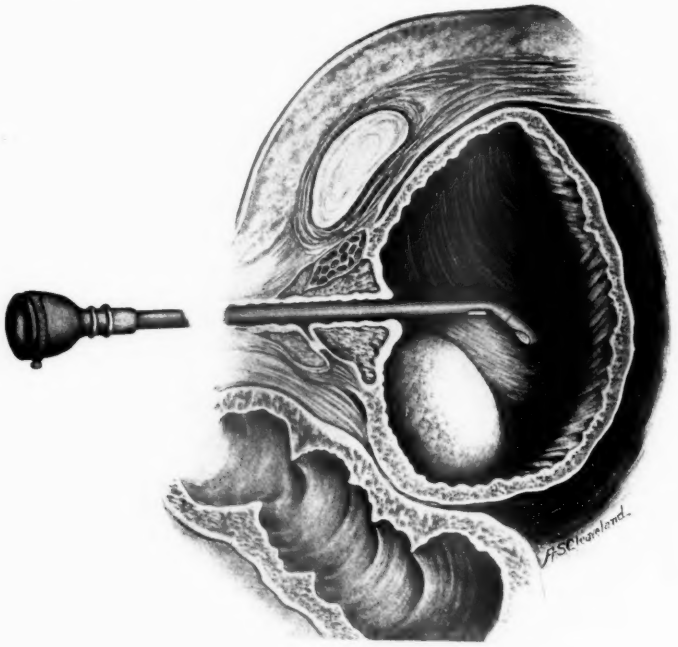

FIGURE XV

Tubercular ulcers are the most intractable and discouraging of any class of cases I have to care for; as they are generally secondary to tubercular trouble elsewhere, principally the kidney. The first thing to do, when possible, is to remove the cause. Tubercular bladders in cases upon which I have done nephrectomy for tuberculosis of the kidney invariably get better, at least for a time. The cases where the tubercular processes begin primarily in the bladder—and I have only two cases which seem to be of that class—resist all kinds of treatcases of ureteral impaction at these points. It should, however, be given a thorough trial before operative intervention is instituted.

Malignant growths involving the bladder are not promising cases for surgical intervention, and my personal experience in operating in these cases is limited to one case of resection of part of the bladder-wall. This was done entirely too recently to state what the outcome will be. So far the case is progressing favorably. Mild antiseptic irrigations and opiates —so-called palliative treatment—are all that

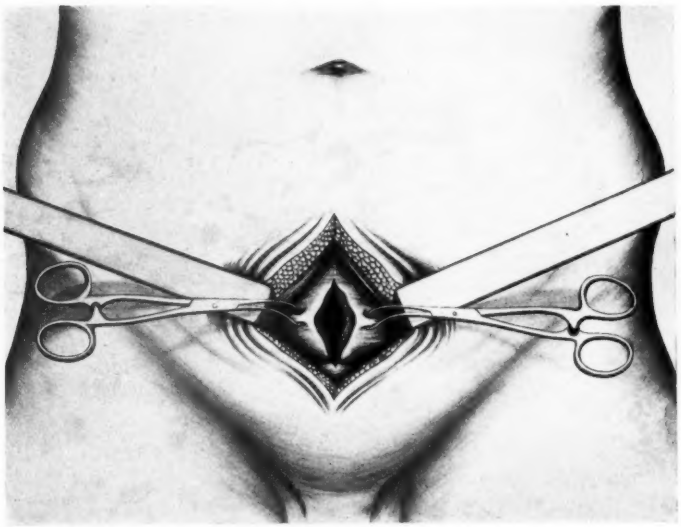

FIGURE XVI

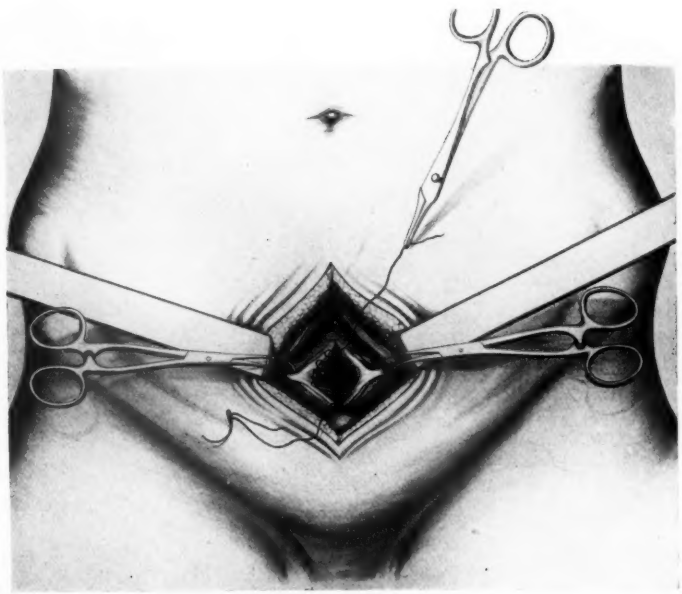

FIGURE XVII

can be done at the time most of these cases are referred to the surgeon.

Vesical calculi are all removed by suprapubic cystotomy, and if the inflammation is not too great, the bladder is immediately closed, as will be described later, and the patient, as a rule, is able to leave the hospital within two weeks. In Great Britain the crushing operation is still the operation of choice by most surgeons. Milton, in the Lancet of October, 1904, reporting the stone cases operated upon in the British naval service in Egypt, gives a mortality of 36.3 per cent by the suprapubic route of large stones removed, and only 5.9 per cent by the crushing operation. I am sure there is no such mortality rate in this country. We have had no deaths and seldom any bad symptoms in a series of suprapubic operations, but I have seen several severely lacerated urethras and am treating a most intractable stricture caused by the lithotrite.

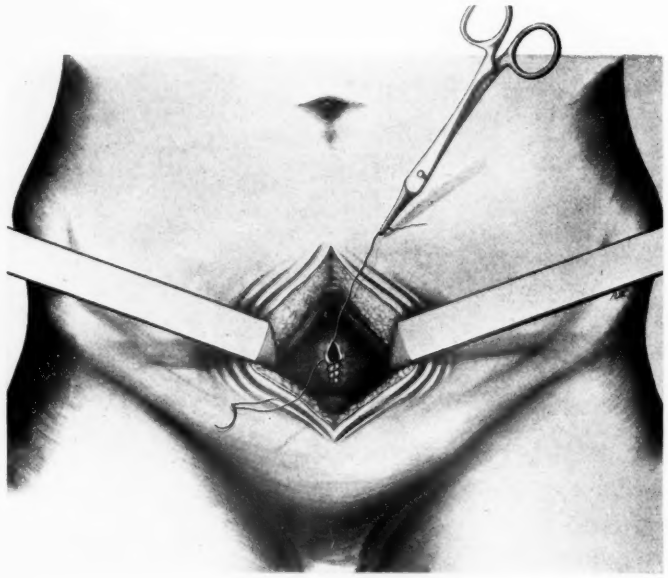

FIGURE XVIII

The technic of doing a suprapubic cystotomy is, briefly, as follows: The bladder is first irrigated with boracic acid solution or sterile water until the solution comes away clear. The reason is plain—to permit as little of the infection as possible to come in contact with the freshly made wound. About 300 c.c. is left in the bladder. This has the double advantage of forcing the bladder above the pubes and of thinning the bladder-wall, so the incision made through the distended bladder-wall will be much smaller as the bladder contracts, like a similar incision in a greatly distended uterus. A Peterson bag in the rectum is never used; fat patients are placed slightly in the Trendelenburg position, the bladder is grasped on each side with a curved tenaculum (Fig. XVI), which holds securely and does less crushing than a hemostatic forceps. The incision in the bladder is made vertical with a sharp knife. As little manipulation or crushing as possible must be the rule. The flexible, plated retractors are best for examining the inside, since they reflect the light. The closure is of considerable importance. Formerly I used interrupted catgut or silk, but, after having two stones re-form

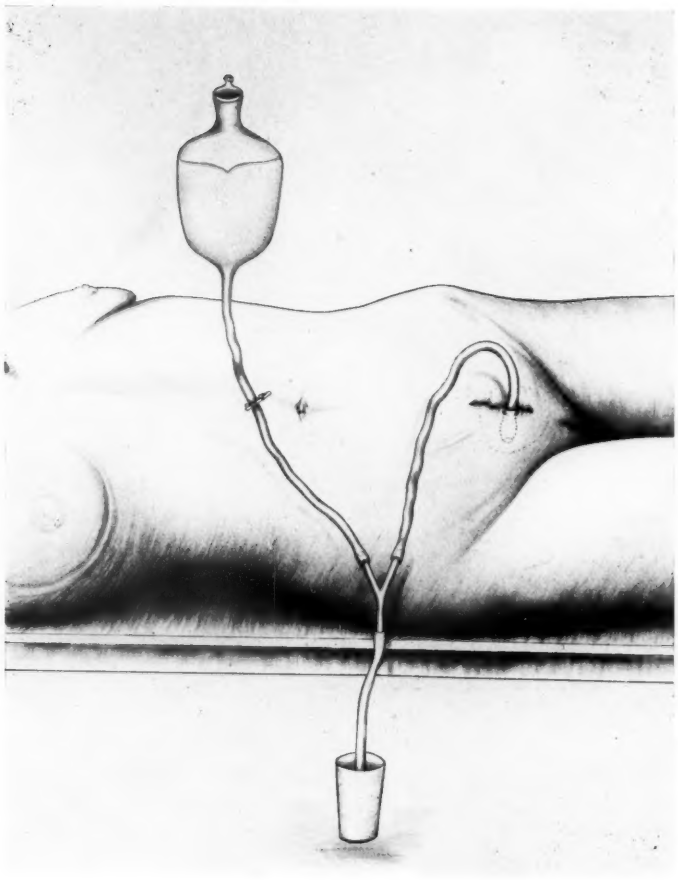

FIGURE XIX.—Showing Y tube, used for drainage and irrigating purposes.

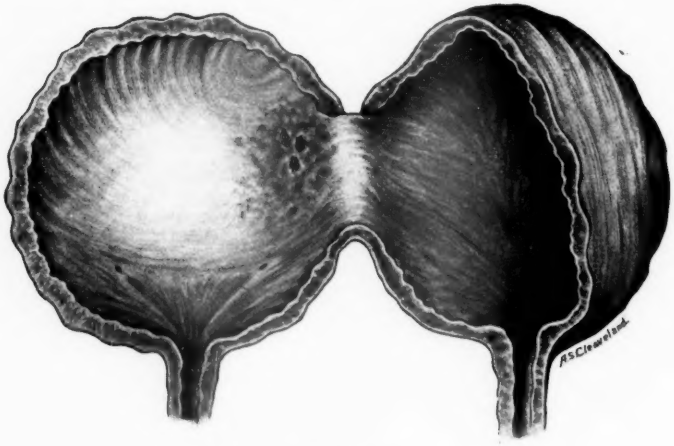


FIGURE XX

around a suture that had sloughed through or fallen into the bladder, I changed to a continuous silk suture. This is introduced through the muscular layer without including the mucosa, and brought back, including the outer layer of the bladder, and tied to the free end left in the start, as shown in Fig. XVII and Fig. XVIII. In this way the suture is encysted within the wall in one large piece, and there is little chance for it, or any part of it, getting into the bladder. A wick drain is introduced down to the bladder-wall, and the outer wound closed with silkworm gut or any suture one may choose.

If the bladder is to be drained, it is best done as shown in Fig. XI, by a Y tube or a simple siphon. For irrigation purposes the Y is better. By this method drainage can be carried on without disconnecting the tube.

## COMBINED MALIGNANT TUMORS OF THE FEMALE GENITALIA

By PALMER FINDLEY, M. D., CHICAGO
Assistant Professor of Obstetrics and Gynecology, Rush Medical College

LITERATURE contains very few records of combined malignant tumors of the female genitalia.

Gebhard reports a case in which there was a round-cell sarcoma with a few giant cells in the mucous membrane of the corpus, and underneath this tumor were glands which were evidently carcinomatous.

Rabl-Rückhard placed on record the case of a woman fifty-one years of age, who had borne two children and had passed the menopause fourteen years. For four years she had experienced a uterine hemorrhage, alternating with leucorrhœa. At the end of this time there were expelled from the uterus two necrotic tumors the size of a man's fist, which were identified by means of the microscope as round-cell sarcomata, in which were incorporated areas characteristic of a squamous-cell carcinoma. Death soon followed, and at the autopsy the cavity of the uterus contained a typical alveolar carcinoma.

Virchow speaks of "sarcoma carcinomatodes" as of not infrequent occurrence in the corpus uteri, and in another instance he writes of a carcinomatous degeneration of a uterine sarcoma.

Klein mentions the following case: A nullipara, fifty-nine years of age, eleven years past the menopause, possessed a round-cell sarcoma

of the corpus, the size of a man's fist, which protruded as a polyp into the vagina. This was removed, and in a short time it recurred to an equal size; incorporated in this sarcomatous tumor were carcinomatous glands.

Rabl-Rückhard reported a second case of a nulliparous married woman, sixty-two years of age, and nine years past the menopause, who complained of a uterine hemorrhage and a watery discharge. An exploratory curettage revealed an alveolar carcinoma, and two days later there was expelled spontaneously a tumor the size of a goose egg, which was identified microscopically as a vascular spindle-cell sarcoma. In addition to these malignant growths, there was a fibroid tumor and a polyp of the corpus and cervix.

Emanuel reported the case of a woman forty-seven years of age, who had ceased to menstruate for one year, and for two years had suffered from a severe leucorrhœa. A sarcomatous polyp of the corpus protruded into the cervix; in this growth there was an entire absence of gland formation. Diffusely distributed over the remaining surface of the corpus was an alveolar carcinoma.

Von Franque records the following case: A virgin, fifty years of age, who had passed the menopause four years, suffered for two years from a uterine hemorrhage, and for one year from leucorrhœa, which in the last three months had acquired a foul odor. The uterus was extirpated and found to be the size of a four months, pregnancy. In the corpus was a sarcomatous polyp of the round-cell variety, and in the lower portion of the corpus and upper segment of the cervix was an adeno-carcinoma.

FIGURE I.—Carcinomatous polyp of the cervix with no invasion of the cervix.

E. Opitz reported at length the case of a woman fifty-seven years of age, who had passed the menopause six or eight years and had borne two children. For nine or ten weeks she had suffered from general weakness, hemorrhage, and leucorrhœa. An exploratory curettage revealed a malignant growth of two distinct varieties; one a typical adeno-carcinoma, the other a spindle-cell sarcoma. The uterus was extirpated, and in the corpus was

found a sarcoma the size of a walnut, and higher in the fundus was a fungus growth made up of malignant glands.

Amann described a sarcomatous polyp of the cervix combined with an adeno-carcinoma of the corpus.

Lagréze reported in detail an anatomical study of a specimen in which there were found in the uterus a degenerated sarcoma, and multiple carcinomatous growths. The two growths were separated by normal mucosa.

The author advances the theory that the sarcoma was the primary growth, and having degenerated, the irritating discharge gave origin to the cancerous growths. To substantiate this theory, he mentions the development of cancer at the seat of eczema, lupus, tuberculous ulcers of the bronchi, bone fistulæ—in connection with sequestra, and cancer of the tongue due to necrosed teeth.

A similar case was described by Iwanoff, in which, on a post-mortem examination of a woman of thirty-eight years, there was found an adeno-fibroma of the uterus, the upper portion of which was carcinomatous and the lower portion sarcomatous.

Von Franque found in sixteen cases of primary sarcoma of the uterus that three were associated with carcinomatous gland formation. Opitz has repeatedly noticed the combination of the two malignant growths in the uterus, and believes they would be more frequently demonstrated if the tumors were more closely scrutinized. It is surprising to note that these cases show a relatively good prognosis. In one case the growths were known to be of four years' duration. It will be observed that in nearly all cases the sarcomata were polypoid, some with very narrow pedicles, and in two of the cases the tumors were expelled spontaneously. In only two cases were the sarcomatous growths attached by a broad base. On the other hand, the carcinomata were usually spread over a broad surface, at times involving almost the entire mucous surface of the corpus.

In our present state of knowledge, or, rather should it be said in our present ignorance, of the origin of malignant growths, no satisfactory

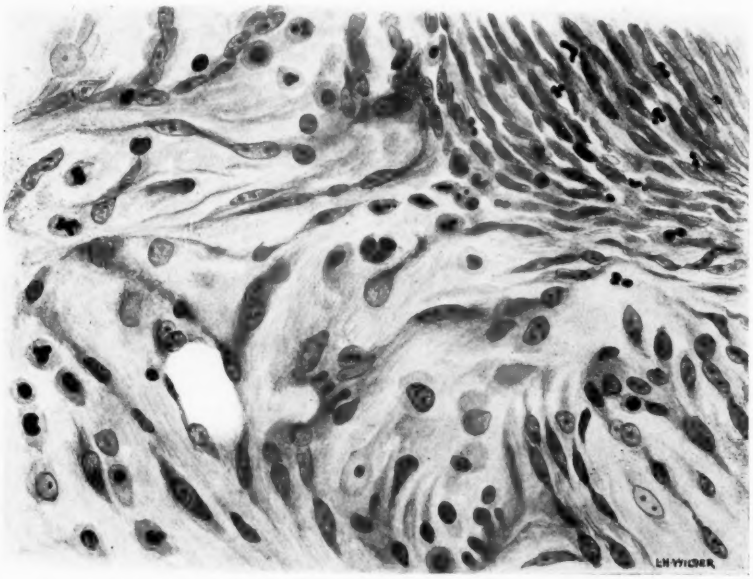

FIGURE II.—Mixed-cell sarcoma of the broad ligament, recurring one year after hysterectomy for a carcinomatus polyp of the cervix in which the cervix was not invaded. (See Figure I.)

explanation can be offered for the combined presence of two malignant growths which differ histogenetically and histologically. Whatever may be the exciting cause of malignant growths, it would appear that the epithelial and connective tissue structures are jointly affected.

Opitz writes of his observations in three cases in which sarcomata of the endometrium were associated with malignant gland formations, and again of a number of cancerous uteri in which there were proliferative changes in the connective tissue and in the endothelium of the blood-vessels of the mucosa, which presented the characteristics of sarcoma and endothelioma.

C. Ruge has repeatedly hesitated in the examination of scrapings between the diagnosis of sarcoma and carcinoma, and other well-known authorities, such as v. Kahlden, Keller, and Gessner, have been similarly perplexed.

I have the following case to report, in which a primary carcinomatous degeneration of a cervical polyp demanded a hysterectomy, which was followed in one year by a sarcomatous growth at the base of the broad ligament:

Mrs. L., age 47, VII, para, menstruations always regular, 28-day type, lasting four to five days. In March, 1904, she discovered a small body protruding from the cervix, and this brought her to me for an examination. A small polyp was seen to protrude through the external os. On the following day it was removed, and on microscopical examination the polyp was found to have a superficial covering of columnar epithelium, beneath which were numerous layers of squamous epithelium, which here and there invaded the connective tissue stroma of the polyp. Irregular gland structures, with a single layer of epithelium, were found in the stroma, and in numerous instances these were surrounded by multiple layers of squamous epithelium. The microscopic diagnosis was carcinomatous degeneration of a mucous polyp. A few days later a vaginal hysterectomy was performed. Convalescence was uninterrupted, and the hope was entertained that there would be no recurrence. Following the hysterectomy, a large number of sections were made through the cervix at the base of the polyp, and in them no epithelial invasion was observed. Our assurance that no recurrence would follow was strengthened thereby. The patient gained in weight and enjoyed exceptional health for one year. At the end of this time she observed a stain of blood, and an examination revealed a polypoid growth protruding into the vagina from the base of the left broad ligament. This was excised for microscopic examination, and in four days it returned to double the original size, or that of an almond. The second growth was freely excised and deeply cauterized, and two weeks later she began X-ray treatments, which have now continued six months. At no time has there been any evident infiltration of the broad ligaments, and at the present writing there is no evidence of recurrence. Microscopic examination of the secondary growth revealed a mixed-cell sarcoma, together with an inflammatory infiltration of small round cells.

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# EDITORIALS

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OCTOBER, 1905

## SCOPOLAMINE-MORPHINE ANÆSTHESIA

Among the many new anæsthetics which are tried and rejected every few years, the combination of scopolamine and morphine bids fair to obtain, and to hold the favor of surgeons and obstetricians. The combination has been in use in Europe since Schneiderlin first advised it in 1900. The development and general introduction of the method is linked with the name of Korff of Freiburg, who has given the best instructions as to its use.

Morphine 3 (three) centigrammes—one-half grain mixed in water with scopolamine hydrobromate 12 (twelve) decimilligrammes—one-fiftieth grain[1] is divided into three doses, which are injected hypodermically,—one dose two and one-half, one dose one and one-half, one dose one-half hour before the time set for the operation. The patients become drowsy after the first dose, sleep fairly soundly after the second, and are fast asleep and insensible to pain after the third dose. Operations lasting hours, if necessary, can then be performed without the patient knowing or feeling or remembering anything about the operation. Such, at least, is the result in one-third to one-half of the cases. In the rest of the cases the patients are sleepy and semi-conscious, but not sufficiently so to allow extensive operating. Then, in addition to scopolamine-morphine, either chloroform or ether or local anæsthesia can be used. The advantage of the scopolamine-morphine, however, is quite marked even then, as the amount of chloroform or ether necessary is extremely small, if scopolamine-morphine has been administered beforehand.

The diminution of the amount of chloroform or ether, if needed after this injection, is so pronounced and so valuable, that a number of surgeons prefer to use a small amount of scopolamine-morphine (about half the dose mentioned above, and injected about half an hour before the operation), merely as a preliminary to the chloroform or ether to be given afterwards. These surgeons then do not even attempt to perform the operation under the scopolamine-morphine anæsthesia, but use it merely with the purpose of saving ether or chloroform, and for the sake of the other advantages to be derived from scopolamine-morphine. Our own experience with scopolamine-morphine (over one hundred operations), when used exclusively, has been so satisfactory, that we use the full dose every time, hoping to be able to perform the entire operation without a drop of chloroform or ether. The spectacle of a patient lying quietly on the table and passing through a vaginal hysterectomy, for instance,

[1] The dose given in *Annals of Surgery*, August, 1905, p. 195, is a misprint.

without a visible anæsthetic or anæsthetizer, is rather weird in the beginning, particularly if the patient, as some do, has the eyes open and seems to be looking on.

The advantages of the anæsthetic are objective and subjective ones. Among the latter, it is of particular importance that the worry and excitement preceding the administration of a general anæsthetic, or even the transportation of the patients to the operating-room, are entirely absent. Also, the patients have no recollection of anything which takes place after the first or second injection; they go to sleep in their beds and wake up in their beds without remembering anything of the trying details connected with a surgical operation. In the same way the disagreeable sensations of the first few hours after the operation are abolished, as the patients sleep about five hours after the last injection.

Among the objective advantages may be mentioned the dryness of the mouth, which prevents lung complications, even where ether has to be added, or where operations near or in the mouth or throat have to be performed. After the operation, vomiting is entirely absent if scopolamine-morphine alone is used, and is almost absent if ether or chloroform have to be added. The scopolamine-morphine does not interfere with the excretory functions after the anæsthesia has worn off.

We have never used scopolamine-morphine on children under twelve years; on the other hand, scopolamine-morphine is invaluable in old and decrepid patients, where chloroform or ether would be dreaded. The older and more feeble the patient, the smaller the dose of scopolamine-morphine needed for complete anæsthesia; so that in such cases two-thirds or even one-third of the dose mentioned above is sufficient.

Except as to the production of sleep and insensibility to pain, scopolamine and morphine are antagonistic to a certain degree, so that, for instance, the depression of the circulation, which might be feared as a consequence of a large dose of morphine, is counteracted successfully by the scopolamine. There is no record that a human being has ever been killed by scopolamine, even if given in much larger doses than mentioned here. There is, so far, no case on record where a death after operation could be charged against the scopolamine-morphine anæsthesia with any degree of scientific precision.

The obstetrician, according to European reports, seems to have the promise of the most happy results from this anæsthetic. It has been used in Continental clinics on large series of cases (800, for instance, in the Freiburg clinic). The administration for obstetrical purposes is stated not to interfere with the contractions, not to lead to hemorrhage, and not to be dangerous to mother or child. The amount used is one-third of the dose stated above for surgical anæsthesia, and is given every five to six hours. Handled in this way, the anæsthetic is sufficient to render labor painless, and increases materially that slight degree of forgetfulness for pain with which nature has so kindly endowed the parturient woman. Where necessary, obstetrical operations can be performed either with the scopolamine-morphine given up to the time of the emergency or by adding an extra dose, or if the most rapid interference is demanded, by using a very small amount of chloroform.

In country and in military practice the new combination promises to be particularly useful, as an operation can be carried out frequently without any chloroform or ether; or, if they are needed, without an expert anæsthetizer. If ether or chloroform has to be used, the amounts necessary are small, and need only be given intermittently and at the discretion and under the command of the operator.

EMIL RIES, M.D.

## "GRAM-POSITIVE STOOL"

By the above expression is meant a stool, a smear from which, when stained by the ordinary Gram stain, shows a preponderance of bacteria reacting positive to Gram's stain. The flora of the normal adult stool is, in the main, Gram-negative, with only an occasional Gram-positive bacterium being present, while the stool flora of many pathological conditions, such as carcinoma of the stomach, or ulcerative processes of the gastro-intestinal tract, usually show a preponderance of bacteria staining positive to Gram—a so-called "Gram-positive stool." This change in the intestinal flora does not vary by accident, but is a result of distinct changes from the normal in the chemico-physical processes of the intestinal tract and when present is of pathological origin.

When one considers that the bacteria most active, directly or indirectly, in ulcerative processes of the gastro-intestinal tract are Gram-positive, i. e., staphylococci, streptococci, and lactic acid bacilli (when young), and that these bacteria are often present in the stools of such patients in immense numbers, it is readily seen that a simple Gram stain of the stool may in certain cases be employed, as a valuable means of diagnosis, where the gastro-intestinal tract comes into question.

The presence of a Gram-positive stool may be used as an important diagnostic point where a gastric carcinoma is suspected, the Gram-positive element being principally the lactic acid bacillus, which in some cases continues multiplying in the intestine after it has left the stomach to the almost total exclusion of the bacilli of the colon group.

This method is considered of great importance in the Neusser Clinic (Vienna) where the diagnosis of gastric carcinoma is not willingly made without the presence of a Gram-positive stool, and on the other hand an exclusively Gram-negative stool is considered to exclude the possibility of carcinoma of the stomach.

The technique of making a Gram stain of the stools is simple, consisting in the ordinary Gram stain as employed for bacteria generally, except that the specimen should be fixed in methyl alcohol for a few minutes before staining, in this way dissolving fatty substances from the smear, which interfere with a clear Gram stain.

The disagreeableness of ordinary stool examinations may be avoided here, since only a very small piece of the stool is needed for the cover-glass smear, and it may be preserved in a small bottle with a few drops of alcohol, which removes the odor of the stool to a large extent, and does not interfere with the Gram stain.

The number of lactic acid bacilli in any case may be greatly increased in the stool by administering a few ounces of sugar of milk the day before the specimen is taken, the sugar of milk increasing the desirability of the intestinal contents as a culture medium for the lactic acid bacillus.

This method of examining the stool by means of the Gram stain has much to recommend itself. In gastric ulcer cases of long standing the Gram stain of the stool may be used as a check upon the development of a carcinoma at the site of the ulcer. At regular intervals of a few months, in such cases, a Gram stain of the stool is made, and a change from the normal Gram-negative to the Gram-positive flora may be used as a sign that an operation is indicated. By this means Docent Schmidt, in Neusser's Clinic, has been able to make a number of early diagnoses of carcinoma developing on old ulcers, at a time which was favorable for operation, and before other symptoms of malignancy had appeared.

In carcinoma of the stomach the Gram stain of the stool, together with the physical findings, may furnish all the data necessary to establish the diagnosis without the necessity

of removing the gastric contents, when perhaps the latter procedure would be contra-indicated.

The differential diagnosis between pernicious anemia and gastric carcinoma may, in some cases, be cleared immediately by a Gram stain of the stool.

In tubercular ulcer of the intestine, a Gram-positive stool due to large numbers of staphylococci may aid in a diagnosis which otherwise may be very difficult. In any case where large numbers of staphylococci are present, especially when present in clumps, one must think of ulcerative processes of the intestinal tract. CHAS. A. ELLIOTT, M. D.

## THE SURGEON'S NEED FOR A KNOWLEDGE OF NEUROLOGY

The general trend of medicine to-day, because of ever-increasing researches, is toward a division of labor, and yet all of the different branches are so much interdependent that to make an accurate diagnosis in a given case one must be drilled in at least the elements of the allied specialties. This assertion is particularly true when we consider the surgeon's need for training in neurology. Where the case demands it, or when conditions are ripe for it, the opinion of a neurologist can be enlisted, but any surgeon can, from his own experience, recall situations when this was either impossible or not feasible.

The varied symptomatology of hysteria affords examples to illustrate the value, in this respect, of a knowledge of nervous and mental diseases. A joint showing actual inflammatory thickening and giving much pain may be only functionally diseased. Even contractures may be only hysterical. The symptom-complex of tuberculosis of the hip or of Pott's disease can be mimicked perfectly by this neurosis, and to render a careful opinion in any one of the legion of post-traumatic disease-pictures requires much neurological perspicacity. Of more moment are those cases in which the usual tenderness over one or both ovaries, associated with hysterical high temperature or perhaps hysterical vomiting, might suggest appendicitis, or those in which peritonitis may be suspected from functional rise of temperature, tympanites, and hyperæsthesia of the abdominal muscles. Such instances, which unquestionably are not so extremely rare, would demand acute analysis from both the neurological and surgical sides.

Neurasthenia is not apt to give trouble, but there are many cases of this nature following operations that are interpreted with difficulty from the surgical view-point. The fact that most of the neurasthenics are intelligent, that they are introspective, and that they are ever ready to subject themselves to treatment—all are calculated to mislead a man with only a surgical horizon.

Again we can call to mind competent and even eminent surgeons who have operated upon tabetics with gastric crises—in one case under the diagnosis of cholecystitis and again when mistaking a middle-line fat hernia associated with gastric crises for a strangulated hernia. Another prepared a tabetic hip for operation under the diagnosis of an unreduced dislocation; still another, we are told, operated upon a Charot knee under the diagnosis of sarcoma.

These examples could be multiplied, but they are sufficient to illustrate the point. The neurologist often ascribes questionable symptoms and signs to a functional basis, but it is his zeal to make a diagnosis that leads him astray. There is, however, another consideration, and that is, that a functional and a surgical affliction may be both present — a truism that cannot be recalled too often. All this is so apparent and so elementary, that to mention it is bare tautology, yet it is certainly true that of all the far-reaching specialties, the surgeon knows least about neurology.

W. H. BUHLIG, M. D.

# TRANSACTIONS OF SOCIETIES

## AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS

PROCEEDINGS OF THE EIGHTEENTH ANNUAL MEETING, HELD IN NEW YORK CITY, SEPTEMBER 19, 20, AND 21, 1905, UNDER THE PRESIDENCY OF DR. HOWARD W. LONGYEAR, DETROIT, MICH.

The Association met in College Hall of the Hotel Astor, and, after the delivery of an address of welcome by Dr. George B. Fowler, which was responded to by Dr. Charles A. L. Reed, the reading of papers was begun.

### MULTIPLE PREGNANCY COMPLICATED BY DOUBLE PYOSALPINX

DR. O. H. ELEBRECHT, St. Louis, Mo., read a paper with this title and reported an interesting case in detail. The most striking feature of this case was the obscurity of this rare complication, for without the autopsy he would certainly have abided by his first and only ante-mortem diagnosis, i.e., sapremia, and would have continued to believe that the general peritonitis was the result of the sapremic infection traveling upwards through the tubes and thus into the abdominal cavity, for such a process, to his mind, would be all the more plausible in the large and flabby uterus of multiple pregnancy, more especially from the fact that large blood-clots were passed on the first day, showing the relatively imperfect contraction of the uterus. The case also showed very plainly the ability or the degree of tolerance of the pelvic peritoneum to cope with infections, as it was the author's opinion that the peritonitis was not general until the sixth day, for up to that time there was no hiccoughing, no vomiting, no abdominal distention, and no apparent weakness. Another deduction was, that gonorrhœal peritonitis, while not very dangerous if confined to the pelvic peritoneum, was surely dangerous when it crept out of the pelvis and became diffuse. It was also his firm belief that the pyosalpinx in this case was unilateral at the time of impregnation, and that the infection was transmitted by the escape of virulent pus to the open fimbriæ of the unaffected side.

The only cases he could find analogous to his had been reported by Hare and Talley. The reports of two pathologists in the speaker's case, who worked independently of each other, both showed that the tube, which was secondarily infected, was infected by way of the fimbriæ, as its pathology was confined entirely to its outer third; the middle third showed only slight inflammatory changes, and the inner third, including the uterine attachment, was normal.

Blank projects the theory that virulent bacteria in the tube have a tendency to produce a pyosalpinx during pregnancy by reason of the hyperæmia. He further states that fifty per cent of those cases in which the tubes are adherent in the cul-de-sac rupture as pregnancy advances, from tension, pressure, or from stretching of the adhesions, which forces pus out of their fimbriated extremity. The experience of the author with three cases of this class substantiated Blank's theory. These three cases were reported.

#### DISCUSSION

DR. CHARLES A. L. REED, Cincinnati, Ohio, said that this case with the pus-tube undetachable only added one possible condition that pointed to the reason why the class of cases under discussion should not be subjected to operation earlier and more radically than they had been heretofore. With a double pus-tube, with antecedent conception, it followed that the deduction of the essayist, that the infection of the tube was unilateral prior to impregnation, was absolutely incontestable. As to infection on the other side, the probability was that it resulted from a progressive invasion of tissue, the mucous structure serving as the nidus of infection occurring within the uterus following delivery.

DR. HERMAN E. HAYD, Buffalo, New York, was inclined to believe that many cases of pyosalpinx complicating delivery were seen that were due to a latent gonorrhœa existing in the tube, which sprang into activity as a result of the trauma incident to labor.

Dr. Charles L. Bonifield, Cincinnati, Ohio, believed many cases of double pyosalpinx cleared up sufficiently to allow the patients to become pregnant. In years gone by, he had informed patients they would never become pregnant when he detected a mass on each side and there were further evidences of pyosalpinx, and on a few occasions he had been deceived after six, eight, or even twelve years, the pus having become absorbed and the women having become pregnant. He cited a case that came under his observation many years ago of double pyosalpinx, or he thought it was such. The woman refused operation. Everything in the pelvis was matted together. She gradually got better, and at the end of six or eight years (he could not remember the exact time) became pregnant, and he delivered her. She passed through labor smoothly, but at the end of a week she suddenly rose up in bed and dropped over, dead.

Dr. Rufus B. Hall, Cincinnati, Ohio, did not believe that a woman with double pus-tubes could afterwards become pregnant. If such a woman should become pregnant, he would have some doubt as to the diagnosis of bilateral pyosalpinx.

Dr. John Young Brown, St. Louis, Mo., thought the mere existense of pregnancy in the case reported by the essayist precluded the possibility of the woman having had bilateral pyosalpinx. The pathology, as revealed by the autopsy, showed conclusively that the case was one of unilateral pyosalpinx, which had lain dormant and was kindled by the trauma of labor and that the leakage from the pus-tube produced the diffuse peritonitis, and the condition found on the other side was due to bathing this side with the pus that was produced by the peritonitis.

Dr. James F. Baldwin, Columbus, Ohio, had not had a case of double pyosalpinx followed by pregnancy, yet he thought it might occur.

Dr. Lewis S. McMurtry, Louisville, Kentucky, said that abdominal section in a puerperal convalescent was a very serious procedure. The operation of vaginal incision and drainage, so enthusiastically advocated by Pryor, would accomplish very little in a case like the one reported, from the standpoint of therapeutics; hence in this case we had a very valuable addition to the scanty literature of the subject as to the possibility of pathology of the tubes connected with puerperal disease, and a very valuable guide to operative interference.

## Some Considerations on the After-Treatment of Abdominal Sections

Dr. Walter B. Chase, Brooklyn, New York, stated that in reviewing his personal experience he was led to the conclusion that the principal, and by far the most frequent, condition after laparotomy requiring treatment was flatulence. The accumulation of gas in the intestinal tract was present to a greater or less extent in a majority of cases. The principal causes were reversed peristalsis, intestinal paresis, and the effect of the anæsthetic itself. He seldom gave anodynes, except in conditions of pain, making a possible exception in cases when peritonitis was present prior to operation, or other structures involved in the operation were so friable that peristalsis should be prevented for a time, or in cases following intestinal anastomosis. Its administration for the relief of pain was admissible, and perhaps mandatory. It was a matter of much moment when anodyne was selected. Ordinarily, he used codein hypodermatically in doses of gr. $\frac{1}{4}$ to $\frac{1}{2}$, or more, if required. While its power to relieve pain and check peristalsis was much inferior to that of morphine, its lesser disturbance of the nervous system, checking of secretion, and tendency to undue constipation made it an agent of great value. It was imperative that a reliable preparation be used. In troublesome cases of continued nausea, the administration of small doses of cocaine, gr. 1–10 to 1–12, exercised a salutary sedative influence on the nerves supplying the stomach, and was attended with happy results. Either the nausea or flatulence, or both, might disappear in a few hours after operation.

Among the new remedies for the relief of intestinal paresis was the alkaloid of the Calabar bean. Salicylate of physostigmine, given in doses of gr. 1-100 to 1-50, or even more, hypodermatically, repeated once in four hours, seemed to induce a powerful contraction of the circular fibers of the intestinal tract.

The diet of patients after abdominal section called for the greatest circumspection, always following the rule that nourishment, taken per orem, before the stomach retained or digested it, was positively harmful.

When shock was profound, minute doses of morphine sulphate were among the most powerful stimulants, and superior to most for prompt and sustained effect.

The author discussed at length the importance of bodily temperature and position of the patient after laparotomy.

## Some General Principles in Conservative Pelvic Surgery

Dr. John F. W. Whitbeck. Rochester, New York, said it was decidedly advantageous to have

a general knowledge and a general experience before making use of special methods in the treatment of pelvic disorders. Medical and mechanical means should be tried in suitable cases before resorting to surgical intervention. Only diseased organs should be removed. Sound organs and normal parts of unhealthy organs should be preserved. Conservative plastic surgery should be employed to save such organs as could be made to functionate or to serve some useful purpose. Diseased organs should be removed in the order of their pathological precedence and importance, with a view to benefit the patient by promoting her comfort and prolonging her life, even if a perfect cure was not to be expected.

### Trivial Pathological Conditions of the Uterus and Anexæ Considered as Causes of Severe Gastric Disturbances

Dr. Francis Reder, St. Louis, Mo., stated that during the last two years eight patients had come under his observation, six of whom presented a train of symptoms that would ordinarily be grouped as those of hysteria or neurasthenia, moderately severe in character. The two remaining patients were free from any such pronounced neuropathic phenomena, and some in fairly good health, with the exception that their stomachs were weak. The pelvic organs of these patients, upon examination, gave evidence of disease, and although the examination did not reveal anything of a serious nature, still, local minor operations afforded relief.

In the cases cited by the author it was a surgical procedure that anticipated the pathological conditions. In the opinion of the author, to wait for pathological conditions to give evidence of their existence by more pronounced local symptoms in gynecological disease, where there was a marked reflex neurosis, would be to invite secondary conditions that might prove of a very grave nature.

Dr. Rufus B. Hall, Cincinnati, Ohio, thought the cases reported had pathological conditions sufficiently marked to justify operation, regardless of their neurotic condition. To cure nervous patients it was sometimes necessary to remove every obstacle in the way of perfect health physically. He was convinced that if many of these cases had not been operated upon, their condition would have become worse, a more grave pathology would have resulted later, and it would not only have been more trying for the patients, but would have rendered the surgery more difficult and the recovery of the patients less easy.

Dr. X. O. Werder, Pittsburg, Pa., was not enthusiastic about operating on neurotic patients, as the results were not usually good, and he feared the essayist would have some of the patients upon whom he had operated return to him in a few months with the same symptoms for which they had previously sought relief.

### Prolapsus Uteri and its Treatment

Dr. Herman E. Hayd, Buffalo, New York, spoke briefly of the various conditions which contributed to the production of prolapsus uteri, and then discussed its treatment by surgical means only, and, according to the degree of descensus and the necessity for the preservation of the uterus, the operative treatment was carried out. He believed that in minor degrees of prolapsus uteri, with rectocele and cystocele, the Alexander operation, with well-directed plastic surgery of the vagina and perineum, would cure these simple forms. When the prolapsus extended to the introitus, or the cervix pointed through the vulva, a vaginal hysterectomy, with a well-performed anterior and posterior colporrhaphy and a perineorrhaphy accomplished the best results; and the effect was permanent if the vault of the narrowed vagina was sewed firmly to the cut edges of the broad ligament. When it was desirable to save the uterus for the purpose of child-bearing, or to continue the function of menstruation, the cervix must be amputated, an anterior and posterior colporrhaphy and perineorrhaphy must be done, and the uterus firmly ventrofixated to the abdominal wall through a medium abdominal incision. Usually all these operations could be performed at one sitting, but if it was desirable to make two operations, the posterior colporrhaphy and perineorrhaphy must be done at the second time, say three weeks after the first operations. The author, however, preferred the removal of the uterus, as this operation had been infinitely more successful in his hands. He also deprecated the performance of all operations which closed the vagina, as he believed this was unnecessary, and because he had seen much unhappiness result from this procedure.

For the extreme cases of pelvic hernia, he was particularly pleased with a reprint sent to him by Dr. Crile, in which he advocated a very elaborate and extensive operation. For one such case, which occurred in his own practice, he sewed the united vagina and broad ligaments to the abdominal wall, and the result was very satisfactory. However, such extreme measures were seldom called for, as most cases could be cured by the other operations described.

Dr. Hayd then detailed his operation upon the

posterior vaginal wall and the perineum, in which he cut out a large triangular piece of the posterior central part of the vagina, and then with the finger in the rectum as a guide to make tense the obturator fascia and levator ani muscle, sewed these two opposing surfaces or structures in perfect apposition, with fine chromic gut, which layer of sutures was buried by bringing together the vaginal mucous membrane by another layer of sutures, and finally the skin was brought together by silkworm gut. This operation lessened the size of the vagina and lengthened it by producing an oblique canal instead of a horizontal one, and by carefully approximating the fascia and levator ani, the *sine qua non* of all perineal operations, the result remained fixed and permanent.

### Surgery of the Liver

Dr. William J. Gillette, Toledo, Ohio, read a paper on this subject, in which, after discussing the control of hemorrhage, the power of the liver to regenerate itself, infection and cholemia, he described a means of controlling hemorrhage from the liver in certain cases of severe bleeding when the blood-vessels cannot be reached easily. It sometimes happened that to tie them required a further enlargement of the lacerated liver substance. This, of itself, increased the gravity of the patient's condition.

Three years ago he was called in haste to see a young girl of fourteen years, who had been shot by a target-gun, the bullet entering between the eighth and ninth ribs, near the costal cartilage, passing through the right lobe of the liver and lodging behind the stomach. The low velocity of the bullet had caused it to make a tear rather than a perforation. When first seen, the patient was nearly pulseless, and manifested all the evidences of a severe internal hemorrhage. Her face and lips were white and bloodless. The abdomen was opened. An incision was made close and parallel to the costal cartilages on the right side. The abdomen was found full of blood, which could be seen freely oozing from the torn liver. He attempted to control this first with catgut ligatures, but the friability of the tissues prevented it. Some time previously he had had an experience with a similar wound of the liver, made by a bullet, and had attempted to control the hemorrhage by packing with gauze; but the patient, a strong, robust man, promptly died from the continued loss of blood. Post-mortem examination revealed that the gauze packing had been entirely inadequate to control it. Having this case in mind, he did not feel like trusting the gauze again, and inasmuch as it was not controlled by direct ligation, it occurred to him that by passing sutures from within entirely through the liver substance and through the abdominal wall, making exit between the ribs after the manner of a staple, and tied firmly on the cutaneous surface, that permanent and constant pressure could be made sufficient to control the hemorrhage without the ligature cutting into the friable liver tissue. Five or six such sutures were now introduced on the proximal side of the wound, each one embracing about three quarters of an inch of the liver substance. Care was taken to link them together so as to include all the bleeding tissues in their bite. The ligatures emerged between the ribs the same distance apart as they were entered on the liver substance, and when firmly tied, all the hemorrhage and oozing ceased at once. Other injuries to the viscera, which were slight, were repaired, a drainage-tube inserted, and the abdomen closed. The patient made an uninterrupted recovery.

He had since used this method in two cases, in one of which, in removing a very adherent gall-bladder, he met with a severe hemorrhage which was readily controlled with it. Recovery was prompt. The third case was one in which a hydatid cyst, the size of a small cocoanut, was removed, together with a large number of gallstones from a suppurating gall-bladder. This patient unfortunately died from peritonitis a few days later, but the hemostasis was perfect.

The author referred at length to the more recent contributions to the surgery of the liver.

### Papillary Cystadenoma of the Breast

Dr. Edward J. Ill, Newark, New Jersey, contributed a paper with this title, and said that this disease was comparatively rare, but that he had seen eight cases in his practice. There was very little literature concerning the disease. Its characteristic symptoms were a clear, yellowish-pink to dark bloody discharge from the nipple. On palpating the breast a small tumor could be made out early in the disease which might become multinodular later on. He had observed cases from a few weeks to eleven, twelve, and twenty-one years. The pathological condition found was a papillary adenomatous mass projecting into the milk-duct. It was non-malignant in character. The patient might get well without any interference. When the disease persisted, he advised removal of the breast.

Dr. Miles F. Porter, Fort Wayne, Indiana, said that cystadenoma of the ovaries and of other

organs was prone to become malignant, and no man could tell whether the tumor was malignant or not until he had removed it and had carefully examined it. Some of these tumors were pronounced to be non-malignant by microscopists; yet there was recurrence after their removal. Again, others that were pronounced malignant, and operated upon, recurred.

Dr. Joseph Price, Philadelphia, Pa., had never regretted the early removal of tumors of the breast, for fear that they might become malignant. He cited interesting cases in point, which illustrated the importance of early operation.

Dr. Gunther, in closing the discussion for Dr Ill, said that these patients were not aware that they had a tumor. If they had one, it was very small. There was no involvement of the axillary glands, and they sought medical advice principally on account of the discharge mentioned from the nipple. The history and symptoms in these cases were sufficient to exclude malignancy.

### The Byrne Operation and its Application in the Radical Treatment of Cancer of the Cervix

Dr. X. O. Werder, Pittsburg, Pa., in a paper on this subject, described the operative technic employed by Bryne, and said that Bryne placed special stress on the importance of thorough and repeated cauterization of the wound surfaces and edges from which cancerous tissue had been removed, regarding it as the best safeguard against a recurrence of the disease. The most remarkable feature of the Byrne operation, when compared with all other operations undertaken through the vagina for the cure of cancer of the cervix, and one which seemed to justify Byrne's conclusions, was the almost uniform absence of local recurrence. While employing the method described by Byrne in his first cases, he invariably followed it by the ablation of the remaining portion of the uterine body and appendages. Subsequently, however, he simplified the procedure very materially by dispensing with the preliminary amputation of the cervix. The principal features of the Byrne operation had been retained, namely, thorough and repeated cauterization of all wound surfaces and edges. The operation differed from the usual vaginal hysterectomy by the use of the cautery knife for detaching the cervix from its vaginal connections; the application of the electro-thermic clamps devised by Downes, and the final cauterization of the stump with the dome-shaped cautery.

Dr. Werder described the technic as he employs it at the present time, as follows:

"The cervix is curetted with a heavy, sharp spoon curette until all necrotic tissues are removed, and the bleeding surfaces cauterized until all oozing is controlled. The cervix is then firmly held with vulsellum forceps and an incision is made entirely around the cervix at a considerable distance from the affected area by means of the cautery knife, keeping it at a dull heat and never turning on the current until the knife is placed against the tissues to be burned. In this manner no oozing will take place and the parts will remain perfectly dry. While making traction upon the cervix, the dissection is carried up carefully between the bladder and uterus, an assistant with a retractor drawing the bladder wall away from the hot knife. With the aid of the index finger the peritoneum is then reached and opened with a blunt scissors. Douglas' pouch is opened posteriorly in the same manner and the lateral vaginal attachments are burned through. The bladder is then widely separated from the uterus and broad ligaments by inserting the index fingers of both hands with the palmar surfaces directed towards both pelvic walls and making firm lateral traction. The fundus uteri is then seized with vulsellum forceps and dragged down into the vaginal outlet, while a broad retractor in the hands of an assistant holds up the bladder against the symphysis pubis and well out of the way during the subsequent steps of the operation. Pads are now introduced into the pelvis to hold back and protect the abdominal contents. Ordinary heavy clamps are then applied to the whole broad ligament, first on one side, two usually being required on the other side. The same procedure is then repeated on the other side and the entire uterus and appendages removed. Thus far the operation differs very little from the old clamp method of vaginal hysterectomy, excepting that all incisions have been made with the cautery knife. After packing off the pelvic cavity very carefully with gauze pads, the upper clamp on the infundibulopelvic ligament is seized, the ligament put on a stretch, and a Downes electro-thermic clamp applied externally to it, protected by the shield and additional pads, if necessary. The tissues included in the forceps are then thoroughly cooked until a good ribbon is obtained. The Downes clamp is then removed, the ribbon cut through near its inner edge, and if after a few moments no bleeding occurs, dropped. The next clamps are then treated in exactly the same manner until both ligaments and all other uterine attachments have undergone this cooking process."

Of the sixteen cases operated upon by Dr. Wer-

der, only one died, about four weeks after the operation, from uremia. She is supposed to have suffered from nephritis for ten years previously. The operation, he thought, might have hastened, but not caused, her death.

### Indications for Hysterectomy in Puerperal Septicemia

Dr. Charles Greene Cumston, Boston, Mass., stated that hysterectomy applied to the treatment of acute puerperal infection was as yet a mooted question as far as its indications were concerned, and it would be quite as illogical to advise this interference in all serious cases as it would be to systematically condemn it. All surgeons seem to be in accord as to the great difficulty of formulating the indications for this operation, and especially the time when these became formal. To come to a conclusion, all clinical methods of examination and those of the laboratory must be employed. The latter, however, were far from being of equal value, as no positive result could be obtained from a bacteriological examination of the lochia or blood. Cytological examination of the blood would give excellent data as far as the prognosis of the type of infection was concerned. Clinically, there was no one valuable sign, but, taken altogether, the symptoms obtained by careful intra-uterine examination might indicate the necessity for surgical intervention when all other therapeutic procedures had ailed. Septicemia occurring at once after labor could not derive benefit from surgery, but, on the other hand, it would appear that hysterectomy was indicated in cases of secondary septicemia with a slow evolution, or those taking on a pyemic type proceeding by successive stages, on the condition that there were no visceral metastases, in which case surgical treatment would be the method of exception.

### Abdominal Hysterectomy for Multiple Fibroids Complicated by Pregnancy

Dr. J. Henry Carstens, Detroit, Mich., read a paper on this subject, in which he reported the case of a woman, 42 years old, who was never pregnant before. The tumor had been noticed for five or six years, but was not accompanied by hemorrhage. Menstruation was regular until May; there was a slight show in June and July. He operated upon the woman in the middle of August and removed the tumors. The growths became rapid during the last three months. The patient made an excellent recovery from the operation.

These cases were not uncommon; still, they were sufficiently rare to warrant reporting them. In nearly all cases the women were sterile; a growth developed, and after some years they became pregnant, which prompted one to suspect that there was some abnormal condition of the uterus, perhaps some malposition, which prevented impregnation, but as the result of the presence of the growth the uterus was pulled up or pushed over in one direction or another in such a way that the ova could pass into the uterus and cause pregnancy to take place. This seemed to him to be the correct explanation of the occurrence of pregnancy in sterile women after the development of fibroids.

In reference to general rules for such cases, the cases varied so much that no definite rule, he thought, could be laid down to govern all of them, but, on general principles, he thought cases of fibroid tumors complicated by pregnancy could be left alone if they were subperitoneal and located in the upper half of the uterus. Fibroids, however, located in the lower half of the uterus or in the broad ligament should be removed. Fibroid tumors that were adherent or complicated with other pelvic diseases should be removed by enucleation, or in some cases an abdominal hysterectomy should be performed.

### Personal Experiences in Myofibroma of the Uterus

Dr. Miles F. Porter, Fort Wayne, Indiana, presented some of the more important facts gained from the treatment and observation of over 125 cases of myofibroma of the uterus. The earlier cases having been seen during a rather exacting general practice, and many of them operated upon away from home, in private houses, without adequate assistance, accounted for the fact that the records of this part of the author's work were imperfect. Of the 125 cases, more than 100 were subjected to supravaginal hysterectomy. Two vaginal hysterectomies were done in which the abdomen was entered. Myomectomy through the abdomen was done six or eight times only, except cases in which small fibroids were removed during celiotomy for other causes, and these were not considered. Hemorrhage was not so prominent a symptom as was so generally thought. In two cases this was the immediate cause of operation, and in one it manifested itself first after establishment of the menopause. Pain, especially during the menstrual period, had been the most common symptom. Only one case of pyosalpinx as a complication was seen. In one, an eight-and-one-quarter-pound tumor was removed from a four-and-

one-half-months pregnant uterus. Normal labor at term followed, and one child had been born to the mother, since, without accident. In one case the pregnant uterus was removed for pain, on the theory, which the specimen proved correct, that the woman could neither miscarry nor carry the child to term. The third was operated because of mild sepsis due to retained fetus. Both recovered.

He said that women with fibroid tumors were peculiarly liable to infection following labor, miscarriage, or menstrual flow. In several cases this danger was the chief indication for operation. Three cases were reported to support this opinion. The rapid growth of fibroids during pregnancy was believed to be more apparent than real. Partial or complete sterility was common in fibroid patients. But one case of malignant degeneration was seen. But one case died. This was due to the breaking down of a large vaginal tumor co-existing with a large abdominal tumor. Both were removed through the abdomen. The removal of the vaginal tumor per vaginam by morcellation, and an abdominal hysterectomy later, he thought, might have saved the patient, who died from the effect of the sepsis from which she was suffering at the time of the operation, combined with the effect of the shock and loss of blood. One case of dermoid of the ovary with multiple fibroids was met with, one practically a pure myoma, and one fibroid of the ovary complicating fibroid of the uterus.

Oöphorectomy for fibroids was not a justifiable operation, as it neither stopped the hemorrhage nor the growth of the tumor. The ideal operation for myofibroma would leave the genital tract intact, or as nearly so as possible within reason. The tubes should always be removed when operation rendered pregnancy impossible. Healthy ovaries should be left, as should healthy cervices. Whether to operate through the vagina or through the abdomen might be determined before the operation was begun, but the details of the technic should be developed as the operation proceeded. In rare cases the elastic ligature was of service. Twice the bladder was cut, but was immediately repaired, and no harm resulted. One case had a hemorrhage from a split of the broad ligament, which occurred the night following the operation, as a result of the patient starting violently during a dream. No trouble from silk as ligatures was experienced, but, because of the evidence against it, catgut was substituted as soon as he had learned to sterilize the latter by heat.

The death rate of abdominal operations need not be over two per cent, and the vaginal operations involving the peritoneal cavity should not be above one per cent.

### Unusual Dilatation of Cornual Blood-Vessels, with Rupture into the Uterine Cavity; Hysterectomy, Followed by Recovery of Patient

Dr. Frank F. Simpson, Pittsburg, Pa., reported an interesting case, and said that, apart from their association with neoplasms, vascular changes were not infrequently found when persistent bleeding occurred near the menopause. Arterio-sclerosis was rather common; but aneurism, aneurismal varix, and varicose veins occurring within the myometrium were rare.

In this case there was an excessive vascularity of the uterus, with sclerotic arteries and varicose veins. The sclerosis was found in its several forms, varying from a slight nodular infiltration of the intima to complete obliteration. In addition, we had the unusual spectacle of greatly dilated varicose veins, which were the subject of repeated spontaneous rupture, with repeated spontaneous closure.

In the author's case there was a clinical picture which portrayed the perils of this disease in its most serious form. In the well-marked cases that had come under his observation, arterio-sclerosis of the uterine vessels had been accompanied by menorrhagia and metrorrhagia, which began between the ages of 38 and 45. They became more and more pronounced, had resisted medicinal and minor surgical measures, finally endangered life, and had yielded only to hysterectomy. In this case, however, the first symptom was a furious hemorrhage, due to the rupture of a large varicose vein into the uterine cavity. Within two months three other hemorrhages burst upon her without warning, and each imperiled her life.

The gross pathological findings made it clear that, without surgical intervention, hemorrhage or infection would inevitably have closed the scene within a short time.

### Primary Bowel Resection versus Artificial Anus in the Treatment of Strangulated Hernia

Dr. John Young Brown, St. Louis, Mo., limited himself to a discussion of the surgery of those neglected cases in which, at the time of operation, the intestine found in the hernial sac was so damaged that the operator was forced to resort to one of two procedures; namely, the establishment of an artificial anus, or a primary bowel resection.

During the last eighteen months he had operated upon seven cases of strangulated hernia; four of these were males, three females. In four, the hernia was of the inguinal variety, and in three, of the

femoral type. In all, primary resection was done, followed by a radical operation at the hernial site. Of the seven cases, six recovered and one died. The oldest patient was 70 years, the youngest 20. The duration of the strangulation: longest, 57 hours; shortest, 9 hours. Amount of gut removed: longest, 4 feet; shortest or smallest, 8 inches. Portion of gut involved, small bowel. In each case the condition of the bowel was such as to leave no question concerning the advisability of its removal. In all, the resection was done through a supplemental abdominal incision, and the anastomosis was made with the Murphy button. The results obtained he attributed to the careful attention to certain points in the operative technic, a neglect of which had been responsible for the high mortality invariably accompanying the surgical treatment of this condition.

The operative technic employed by the author is as follows:

"When a patient enters the hospital with a strangulated hernia, no effort is made to reduce it by taxis or temporizing methods. Preparation is at once made for operation. This consists of the usual shaving and scrubbing, to which is added a careful stomach-washing with water as hot as can be borne. This latter procedure is important, as it rids the organ of the filth resulting from the retrograde peristalsis always present in such cases. As soon as the preparations are completed, the patient is anæsthetized, general anæsthesia being preferred. For ordinary hernia-work, local anæsthesia can be used with comparative satisfaction, but where distended bowel has to be dealt with, and extensive resection is contemplated, general anæsthesia is safer and far more satisfactory. The classical incision is made at the hernial site, and the sac is reached and opened in the usual manner. Before attempting to relieve the constriction, the sac is carefully cleansed with hot saline solution. This prevents the leakage of septic serum from the sac into the peritoneal cavity. The constriction is now relieved. If the gut distends, and its viability is beyond question, it is returned, and one of the ordinary radical operations for hernia is begun. If, on the contrary, it is deemed advisable to resect, a supplementary abdominal incision is quickly made. By a careful distribution of gauze the bowel can be delivered through this incision with ease and without soiling the peritoneal cavity. The gut being delivered, the operator has full command of the field. In resecting bowel for this condition, there are three important points to be observed: (1) the resection should extend well back into healthy tissue; (2) the distended bowel above the constriction should be drained of its highly septic contents; (3) the work should be done with the greatest possible dispatch. By means of the drainage apparatus (exibited by the author) the work is greatly facilitated. This drain consists of a medium-sized Keith drainage-tube, to which is stitched a long rubber hose. The method of its application is as follows: The extent of the resection having been determined, the bowel is clamped on either limit of the section to be removed. The clamp on the proximal end being placed three or four inches above the point of resection, the gut is now stripped of its contents and a second clamp is placed at the point of proposed incision; the bowel is now incised above this clamp and the drainage-tube is placed in its lumen, being retained there by a silk ligature passed through mesentery and around the intestine. The end of the incised bowel is surrounded with gauze to prevent soiling of the field, the clamp above the drain removed, and the bowel allowed to empty itself through the tube into a receptacle under the table, while the operator proceeds with the resection. The mesentery is now quickly ligated, and the damaged segment of gut removed, and half of the Murphy button is now placed in the distal gut. By the time this is accomplished the drain will have served its purpose, the clamp is again placed above the drain, and the drain removed. The other half of the button is now inserted, and the anastomosis completed. As the drain works with the operator, much time is saved, and one of the most important steps of the operation is accomplished, namely, the thorough removal of gas and septic bowel contents, without loss of time, and with no soiling of the surrounding tissues. The bowel is now washed off with hot saline and returned. A heavy gauze pad is placed in the median wound to protect the intestines, while the radical operation at the hernial site is completed. This accomplished, the general peritoneal cavity is copiously irrigated with hot normal saline solution, a glass drainage-tube is placed in the vesico-rectal pouch, the median wound closed with through-and-through sutures. The patient is now returned to bed, and, as soon as possible thereafter, is placed in the exaggerated Fowler position. The after-treatment is simple. Nothing is given by mouth for forty-eight hours. Saline enemas are administered every three hours, to which an ounce of liquid beef peptonoids is added. If the condition of the pulse should indicate, strychnine and hypodermoclysis are resorted to. Morphine is never used, if it is possible to do without it. The drainage-tube is generally removed at the end of twelve or twenty-four hours."

## A Study of the Etiology of Floating Kidney, with Suggestions Changing the Operative Technic of Nephropexy

The President, Dr. Howard W. Longyear, Detroit, Mich., selected this as the topic of his presidential address.

December 17, 1903, while operating on a young girl of sixteen years of age for appendiceal disease, the author accidently discovered that the right kidney, which was normally placed, could be easily pulled down and held in a firm position of complete prolapse by making traction on the cecum. This led to further observation on the etiology of displaced, loose, or floating kidney, both on the cadaver and on the living subject, and afterwards, as a result of those observations, to efforts to devise an operation that should have for its object the retention of the kidney in its normal position, as well as the anchoring of the ascending colon is such a manner as to remedy the prolapse of the cecum, which usually obtains in these cases, so that it should not exert further traction on the kidney, and through it on the duodenum and renal vessels. The object of the address was to record the results, though unfinished, of these observations.

The fact that the kidney in question could be pulled down and held firmly in this position by traction on the cecum and ascending colon was an indication that there existed a more firm and positive attachment of this viscus to the kidney than was generally believed.

After considering the literature of the subject, the author naturally assumed that the kidney of his patient was pulled down by the adhesion of the peritoneal attachment, or mesentery of the colon, to the fatty capsule of the kidney, and yet the firmness of the attachment was an apparent contraindication. With the object of testing this point, three cases of floating kidney were operated upon. The peritoneal cavity was entered through the usual incision in the loin, the redundant mesentery gathered up, and attached to the incision in the fascia close to the twelfth rib at the upper angle of the wound. In the first case of extreme ptosis, having had Dietil's crises for several years, the ease with which the operation was performed, the amount of slack mesenteric tissue brought out and attached, and the immediate result which it had of entirely replacing the kidney so it could not be pushed down into the abdomen, were very encouraging.

In the second and third cases, however, in both of which the displacement was less pronounced, there was practically no mesentery such as was present in the first case, so that the peritoneal fixation seemed to promise less. However, while drawing out the peritoneal attachment of the bowel and making efforts to push the bowel down, away from the kidney, it was noticed in both cases that there was a cord-like structure passing downward from the lower pole of the kidney, preventing the separation of the kidney and bowel. This was included with the peritoneal tissue and attached with it.

Further investigation of the literature failed to enlighten the author as to the presence of any tendinous prolongation from the lower pole of the kidney, so further investigation was made on the cadaver. The whole upper half of the abdominal parieties being incised and turned downward, the cecum, ascending colon, with hepatic flexure and kidney on the right side, and part of the descending colon, with splenic flexure and kidney on the left side, were removed, the dissection being made from below upwards and the organs removed together in such a manner as not to interfere with their normal attachments to each other. On turning the specimens over, the posterior surface of bowel and kidney on each side showed a similar formation of tendinous attachment to each other. This was found to be formed by the gathering together of fine longitudinal fibers from the fibrous network which forms the framework of the fatty capsule. The tendinous ridge, formed by its attachment to the posterior surface of the ascending colon, could be followed easily between the peritoneal reflections down to the margin of the lower peritoneal attachment of the bowel and close to the junction of the ileum—in fact, near the point of the so-called origin in the female subject of the suspensory ligament of the ovary.

A specimen illustrating the presence of this phrenocolic ligament was exibited.

How much of a causal factor is this embryological remnant in the production of displaced kidney? This ligamentous union of the kidney and bowel the author claimed was the most important factor in the etiology of nephroptosis.

An operation which he had found easy of accomplishment was the fixation of this nephrocolic ligament into the upper angle of the wound without severing it from the colon, and also fastening the redundant mesentery, if it be present, in the lower angle of the wound. The convergence of the framework of the fatty capsule into this ligament makes a structure of sufficient strength to be depended upon to hold the displaced organs, if securely attached to the aponeurotic tissue, preferably where it was thick near the twelfth rib.

### Intestinal Obstruction

Dr. Lewis C. Morris, Birmingham, Alabama, said that delay in operating for the relief of ileus

was due to one of two things: (1) assuming that the diagnosis had been made, the adoption of expectant treatment, with the hope that it would relieve the condition, or that it would recover spontaneously; or (2) the delay resulting from a failure to make a positive diagnosis.

The author reported six cases of intestinal obstruction, and maintained that if all such cases could be given the benefit of operation, the mortality from this condition would be completely revolutionized. The fact that some cases existed for days, and were relieved by operation, led, in cases in which there was an element of doubt, sometimes to delay in surgical interference until the chances for recovery were materially lessened. Occasionally, a positive differential diagnosis was very difficult, but the conditions from which a differentiation could not be positively made were almost invariably equally as imperative in their demand for surgical intervention as would be the existence of ileus. The author pointed out what those conditions were.

Sudden, severe abdominal pain, associated with nausea and vomiting, plus constipation, which did not respond within a few hours to cathartics and stimulating enemas, constituted a condition in which the indications for operation were positive. The ability to isolate a distended loop of the intestine, the presence of shock and stercoraceous vomiting, go to confirm the diagnosis, but the nature of their presence caused undue delay in operating. The more sudden and violent the storm of symptoms initiating the condition, the more imperative the indications for early operation. To reiterate: after the diagnosis of ileus was made, the adoption of treatment, other than surgical, with the hope that it might effect a cure, was utterly unjustifiable, in the judgment of the author, and procrastination, based on the hope of spontaneous recovery, was absolutely criminal.

### Diagnosis

Dr. John B. Deaver, Philadelphia, Pa., said there was a tendency at present of making diagnoses (or of not making them) by means of a consultation of specialists—hematologists, bacteriologists, skiagraphers, and microscopists—instead of by a minute, painstaking, and complete physical examination, together with a careful study of the clinical history of the patient. Too much stress could not be laid upon the latter.

Pathognomonic symptoms were one by one disappearing before the advance of medical and surgical science; but some pathologists and bacteriologists were still ready to give their diagnoses, based solely upon their special findings, with the utmost disregard of the physical examination, and of the natural history of the disease in question.

As to diagnosis by exclusion, the author said it was manifestly impossible to exclude all but one organ, or portion of the body, and therefore a diagnosis by exclusion was an illogical and unscientific method of making a diagnosis. It should always be the last resort.

The tendency to base a diagnosis solely, or almost entirely, on laboratory findings was widespread, and becoming more constantly pervalent. The reason that this fondness for laboratory diagnosis was so widespread was, he thought, because the students of medicine were taught laboratory methods to an undue extent. The constant cry in all medical colleges at the present day was for funds to build and equip laboratories. The students were forced to spend hours at a time in the laboratories, studying the products of disease, or the causes of disease, while the time formerly allotted to the study of the disease itself was reduced to a minimum, or was altogether expunged from the roster. Instead of drilling into the minds of students the eternal principles of surgery, the faculty sent them into the laboratory, to the end that they might become adepts in the art of blood-counting, or be rendered capable of distinguishing between consanguineous tribes of micro-organisms. In his judgment, this was a fatal mistake. While Dr. Deaver earnestly advocated that every young physician returning to his country town should take a good microscope with him, and should examine his patient's blood and urine on every suitable occasion, yet he was thoroughly convinced of the fact that laboratory diagnosis, as it was called, required now, and ever would require, a well-equipped laboratory to render it of any service whatever, and until every physician could possess his own laboratory, or could have a position on the staff of a hospital so equipped, it was worse than useless, it was a criminal waste of time, and a menace to their future patients, to endow students with no skill but in such mechanical methods.

### Appendicitis as a Factor in the Diagnosis and Treatment of Abdominal and Pelvic Tumors; also Complicating Pregnancy

Dr. Rufus B. Hall, Cincinnati, Ohio, believed that the diagnosis of appendicitis, when associated with pelvic and abdominal tumors, or in the pregnant woman, had not received the attention on the part of the general profession that the subject deserved. He called attention more forcibly to the

early recognition of the cardinal signs of appendicitis in these cases. It was a common supposition on the part of the general profession, that when a patient, known to have an abdominal or pelvic tumor, was taken suddenly ill with pain in the abdomen, there was something wrong with the tumor and the cardinal signs of appendicitis were ignored or overlooked.

The author then discussed the differential diagnosis of appendicitis complicating fibroid tumors of the uterus and ovarian tumors; the differential diagnosis of appendicitis complicating tubal disease; the differential diagnosis of appendicitis associated with pregnancy; the treatment of appendicitis complicating fibroid tumors and ovarian tumors and tubal disease, as well as the treatment of appendicitis associated with pregnancy.

### Cæsarean Section

Dr. Henry Schwarz, St. Louis, Mo., reported an unusual case of a child-wife, who was in labor sixty hours, with repeated attempts at forceps-delivery by the family physician. Apparently, she was not infected. Instead of a Porro, as was usual in such cases, he did the classical Cæsarean operation, which was followed by the recovery of the mother. The baby was asphyxiated; membranes and amniotic fluid yellowish green. His assistant worked over the baby an hour at artificial respiration before spontaneous breathing was established. Pressure-marks on the scalp showed locking of the head between the promontory and symphysis; necrotic tissue dropped out a few days afterwards, and the baby recovered.

### Pregnancy Associated with Diabetes

Dr. Magnus A. Tate, Cincinnati, Ohio, mentioned the reports of numerous investigators, calling attention to sugar in the urine of pregnant women. He collected all cases that could be found in literature where pregnancy was complicated by diabetes. He reported an additional case, and presented a study of these tabulated cases as to their frequency, results, mortality, and other similar data.

### Cysts of the Mesentery

Dr. Orange G. Pfaff, Indianapolis, Ind., said that these growths were comparatively rare; their diagnosis was difficult, if not impossible; their pathology was not fully and clearly understood, but most of them, if not all, were of probable embryonal origin. He reported two interesting and instructive cases of mesenteric cysts.

### Abdominal Pregnancy Persisting beyond the Normal Period of Gestation, with Report of Cases.

Dr. Charles A. L. Reed, Cincinnati, Ohio, read a paper, which was based, first, upon three cases that occurred in his practice, as follows:

1. Extrauterine pregnancy with extraperitoneal development of gestation, operated upon, fifteen months after conception, by marsupialization, and terminating in recovery.

2. Extrauterine pregnancy with retroperitoneal development of gestation, operated upon by marsupialization eleven months after conception, and ending in recovery.

3. Extrauterine pregnancy with the development of gestation, within the anterior abdominal wall, complicated with uterine fibroids, operated upon four years and nine months after conception, ending in recovery.

The author next presented résumés of seven cases in the practice of other operators representing various other forms of development of extrauterine pregnancy.

The conclusion reached by the author was, that the placenta presented the chief factor of danger in operation upon these cases. In instances in which the fetus was already dead, and in which there were no symptoms of sepsis demanding immediate operation, a delay for a few weeks was desirable, as thereby the vascularity of the placenta would be greatly reduced, if not entirely destroyed. One case indicated that it might persist to an embarrassing degree after six weeks. The operation by marsupialization was recommended, as it avoided hemorrhage, facilitated perfect drainage, and placed all conditions under control.

The importance of the yeast ferment in eliminating attached fragments of placental detritus was emphasized.

### Observations on the Treatment of Face-Presentations

Dr. Augustus P. Clarke, Cambridge, Mass., said that typical cases of face-presentation were not common. Undoubtedly, nearly all cases of such presentation were originally brow positions, but by some irregular uterine contraction and other incidental factors they changed to the character of face-presentations. If the occiput was anterior in a face-presentation, naturally delivery became impracticable. Schat's method for relief by external manipulation had its advantages as an initial measure. In dolichocephalic cases, other methods would be demanded. Podalic version would some-

times be successful. In mento-posterior presentation, rotation of the chin should be made toward the symphysis pubis. If the child was not dead, and the case was that of mento-anterior presentation. and impaction was taking place, and the maternal pelvis was not too narrow, forceps might with benefit be used. In a mento-posterior presentation, when the case was seen late, and the position of the face could not be conveniently changed, and the child was still alive, symphysiotomy offered the best method of procedure for saving both the mother and the child.

### Myomectomy

Dr. Walter P. Manton, Detroit, Mich., contributed a paper in which it was stated that the ruthless sacrifice of the uterus in many cases of single and multiple fibromyomas of that organ was greatly to be deprecated, and that the influence of good surgery should be toward the discountenancing of such unnecessary procedure. Myomectomy afforded relief in a large percentage of these cases, and had the advantage over hysterectomy, in that the uterus was conserved, its tissues put in the way of renewed health, and functional activity restored. Under modern methods, in skillful hands the dangers from this operation—hemorrhage and sepsis—so greatly feared by the older operators, had been practically removed, and in suitable cases almost any number of tumors, wherever situated, might be enucleated with satisfactory results. In determining on myomectomy as the operation of choice, the age and physical condition of the patient, the arrangement and distribution of the tumors, and the amount of uterine musculature present must be given chief consideration.

### Officers

The following officers were elected: President, Dr. John Young Brown, St. Louis, Mo.; First Vice-President, Dr. James N. West, New York; Second Vice-President, Dr. Frank F. Simpson, Pittsburg, Pa.; Secretary, Dr. William Warren Potter, Buffalo, New York, re-elected; Treasurer, Dr. X. O. Werder, Pittsburg, Pa., re-elected; members of Executive Council, Drs. Robert T. Morris, New York, and Howard W. Longyear, Detroit, Mich.

The next place of meeting was left for selection by the Executive Council.

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### New York and New England Association of Railway Surgeons

The fifteenth annual meeting of this association will be held at the Academy of Medicine, New York City, November 17–18, 1905, under the presidency of Dr. G. P. Conn, of Concord, N. H. One half-day of the meeting will be devoted to a symposium on "Injuries to the Head and Spine." Noted surgeons will take part in the discussion. A cordial invitation is extended to the profession.

Geo. Chaffee, Secretary.

338 Forty-seventh Street, Brooklyn, N. Y.

# ABSTRACTS OF CURRENT LITERATURE

## DEPARTMENT OF SURGERY

UNDER THE CHARGE OF

JOHN B. MURPHY, M. D. — E. WYLLYS ANDREWS, M. D.
FREDERIC A. BESLEY, M. D — WM. R. CUBBINS, M. D.

### COLOHEPATOPEXY, OR COLON-SUBSTITUTION, A NEW OPERATION FOR PERIGASTRIC ADHESIONS AFTER GALLSTONE OPERATIONS. By E. Wyllys Andrews, M. D.

The author discusses the formation of adhesions about the gall-bladder and pyloric end of the stomach before and after operations. He regards the formation of the adhesions after an operation as inevitable as long as the present methods of operating continue.

His contention is, that these adhesions are without harm and produce no symptoms in a large majority of cases. The class of cases in which symptoms do occur are those in which the stomach is adherent to the liver and gall-bladder in such a manner that its right-sided position is maintained. It is in this condition that the operation proposed is curative.

He states that he has never observed symptoms arising from adhesions between the colon, edge of liver, and gall-bladder and passages.

The writer has no faith in Cargile membrane or aristol as a means of preventing the formation of adhesions.

Five cases are cited, in which the stomach was the organ found to be deformed; the deformity being produced by too extensive adhesions between that organ and the liver.

The operation described was devised to prevent the re-formation of adhesions after the separation of the organs, and is called substitution of the colon for the stomach after the latter has been dissected off from the liver.

The technic, briefly, is as follows:

1. A free incision, avoiding old scar.

2. Careful inspection of position and mobility of stomach and separation of adhesions.

3. The transverse colon and omentum are pulled up and thrust into the space between the pyloris and liver. This new relation is maintained by suturing the colon and omentum to the gastro-hepatic ligament.

The following conclusions are deducted by the author:

"1. Gall-tract adhesions are inevitable after disease and operation.

"2. They are beneficent, harmless, and symptomless in all but a few cases.

"3. These few represent malposition, rather than trouble from adhesions *per se*.

"4. The colon, gall-bladder, duodenum, and pyloris can adhere to each other without impairing their function. The other parts of the stomach cause trouble if involved.

"5. Such adhesions will re-form when separated, unless the colon is substituted for the stomach.

"6. The causing of colon adhesions to the liver does not disturb the function perceptibly.

"7. Probably, certain vague gastric disturbances have been treated by gastroenterostomy when the patients would have had more benefit from this operation."—*The Journal of the American Medical Association*, September 16, 1905.

### ACID INTOXICATION AND LATE POISONOUS EFFECTS OF ANÆSTHETICS, HEPATIC TOXEMIA, ACUTE FATTY DEGENERATION OF THE LIVER FOLLOWING CHLOROFORM AND ETHER ANÆSTHESIA. By Arthur Bevan, M. D., and Henry Baird Favill, M. D.

The paper deals with a report of a case of gangrenous ovarian cyst with a twisted pedicle. The patient was operated upon and the case terminated fatally in four and a half days, there being no definite diagnosis of the cause of death. A post-mortem examination was allowed, and a most complete report of the pathological findings was made by Dr. Hektsen. The organs showed a fatty degeneration.

The article reviews the literature on such cases very carefully, and the author draws these conclusions:

1. Anæsthetics, especially chloroform (ether to

a very limited degree), can produce a destructive effect on the cells of the liver and kidneys and on the muscle-cells of the heart and other muscles, resulting in fatty degeneration and necrosis, very similar to the effects produced in phosphorus-poisoning.

2. The constant and most important injury done is that to the liver.

3. This injury to the liver-cells is in direct proportion to the amount of the anæsthetic employed, and the length of the anæsthesia.

4. Certain individuals exhibit an idiosyncrasy or a susceptibility to this form of poisoning which it is difficult to explain.

5. There are certain predisposing causes which favor this destructive effect of chloroform, among which are: (a) age—the younger, the more susceptible; (b) causes which lower the general vitality of the individual, and probably the vitality of the liver-cells, such as diabetes, previous recent anæsthesia, infections from pus germs, diphtheria, intoxications from a dead fetus in the uterus, a gangrenous mass in the abdominal cavity, etc.; (c) exhaustion due to hemorrage; (d) exhaustion due to starvation; (e) exhaustion due to wasting diseases, such as carcinoma; (f) lesions which have resulted in extensive fatty degenerations, such as occur in the limbs in infantile paralysis; (g) chronic diseases involving both liver and kidney, such as cirrhosis and nephritis.

6. As a result of this fatty degeneration and necrosis of the liver-cells, toxins are produced either from the liver-cells themselves or as a result of the failure of these cells to eliminate substances which under normal conditions they eliminate, but which under these abnormal conditions they fail to do, and these substances therefore may accumulate and produce toxic effects.

7. These toxins produce a definite symptom-complex, which makes its appearance from 10 to 150 hours after the anæsthesia. This symptom-complex consists of vomiting, restlessness, delirium, convulsions, coma, Cheyne-Stokes respiration, cyanosis, icterus in varying degree, and usually terminates in death.

8. It is probable that milder degrees of this poisoning are recovered from, and that the transient icterus noticed after chloroform anæsthesia without other evident cause is due to such poisoning, and many cases which exibit restlessness, fright, mild delirium, drowsiness, etc., after anæsthesia may be due to the same cause.

9. This disease is an hepatic toxemia; the toxins producing it hepatic toxins; and possibly the previous condition making its development easily possible should be described as liver-insufficiency. Just as we have for a long time recognized a condition, uremia, in which we find arising from a variety of noxious agents, anæsthetics, poisons, infections, pregnancy, etc., affecting the secreting cells of the kidney and preventing their normal function, a pathological condition, accompanied with a certain definite symptom-complex; so we must now, we believe, recognize a condition involving the liver, in which we find from a variety of noxious agents (anæsthetics, poisons, infections, pregnancy, etc.,) affecting the secreting cells of the liver and preventing their normal function, a pathological condition which we must describe as hepatic toxemia, accompanied with a certain symptom-complex, and showing certain changes post-mortem.

We believe that the condition of acute fatty degeneration of the liver with resulting hepatic toxemia is as definite a pathological entity as is acute pancreatitis with fat necrosis.

10. As by-products in this toxemia, but not as the essential poisons, are found acetone, diacetic acid and betaoxybutyric acid in the blood and urine.

11. Post-mortem reveals fatty degeneration of the liver, fatty degeneration and mild degree of inflammation of the kidneys, and, in extreme cases, fatty degeneration of heart and other muscles. The lesion of the liver we believe to be the overshadowing and important one, and the one which is responsible for the symptoms and fatal result. The injury to the liver, in some cases, is so great as to result in practically a total destruction of the organ.

12. Somewhat similar hepatic toxemias resulting from fatty degeneration of the liver-cells occur in other conditions, and are accompanied with very similar symptoms. In such conditions as phosphorus-poisoning, diabetes, puerperal eclampsia, acute yellow atrophy of the liver.

13. This fatty degeneration of the liver with hepatic toxemia following anæsthesia is almost invariably due to chloroform in the fatal cases.

14. This serious, and even fatal, late effect of chloroform, which has heretofore not been generally recognized, must still further limit the use of this powerful and dangerous agent.

15. The possibility of the development of hepatic toxemia makes chloroform distinctly contra-indicated in those cases in which there exist the conditions which seem to favor its development, i. e., diabetes, sepsis, starvation, hemorrhage; the presence of intoxication from dead material; the presence of fatty degenerations, as already cited, after infantile paralysis, and lesions of the liver. The susceptibility of children to this hepatic toxemia must be recognized. That chloroform is capable

of producing these serious late poisonous effects is a strong argument against its employment, and an argument in favor of the more general use of ether; and yet we are confronted at times with the Charybdis of ether pneumonia on the one hand, and the Scylla of chloroform hepatic toxemia on the other.

16. The recognition of this danger of hepatic toxemia is a strong argument against the employment of chloroform for long anæsthesia, as it can be shown that a two-hour chloroform anæsthesia is almost invariably fatal to rabbits and guinea-pigs, from fatty degeneration and necrosis of the liver-cells; and a two-hour chloroform anæsthesia in man is an exceedingly dangerous thing.

17. These facts in regard to the late poisonous effects of anæsthetics, and the fact that the dangers increase with the amount of the drug employed and with the length of the anæsthesia, form a strong argument in favor of rapid operating and in favor of limiting in every way possible the length of the anæsthesia and the dose of the anæsthetic. For example, time-consuming preparations of the patient should be made before, not after anæsthesia. In the light of this present knowledge, no surgeon can claim, as some have in the past, that after the patient is once asleep, that it makes no difference whether it requires one hour or two hours for the doing of an operation. In the light of this knowledge, for instance, three-hour breast amputations, with the unnecessary ligation of fifty vessels, becomes bad surgery.

18. This problem seems to us a very important one, and worthy of the most careful study and research. At present, we are practically limited to chloroform and ether as general anæsthetics. Each has its danger; each has its special field in which one is safer than the other. We have, as a rule, heretofore, employed chloroform in cases in which there was a previous lung or kidney lesion, and in children, with the idea that it was less likely to produce nephritis and pheumonia, and have used ether in the bulk of our work and felt that it was especially to be selected in heart lesions. We must now add new limitations, and attempt to determine by previous examination whether there is what might be called hepatic insufficiency, the conditions present which favor the development of the late poisonous effect of chloroform on the liver. Another way of solving this problem would be the discovery of new anæsthetic agents, which do not carry with them these poisonous effects, or the employment of the present anæsthetic in such a way as to avoid these dangers.—*The Journal of the American Medical Association*, September 2 and 9, 1905.

DRY IODINE CATGUT. By Alexis V. Moschcowitz, M. D.

The paper deals with modification of the Claudius method of preparing catgut, the object of such modification being to secure a greater tensile strength. The author became convinced that the lack of tensile strength of the Claudius catgut, as prepared by the original method, was due to its long-continued immersion in the iodine solution. The only change he suggests is the removal of the gut from the iodine solution at the end of eight days and preserving it dry and ready for use in a sterile vessel. This being a distinct departure from the original method, it remains to be proven that the dry gut retained the attributes of an ideal ligature and suture material.

These attributes, according to the writer, are:

1. It should be absolutely sterile.
2. In the course of preparation it should not lose any of its tensile strength.
3. It should be readily and simply prepared and without undue expense.
4. It should be absorbed completely, but only after it has served the purposes for which it was intended.

A large number of experiments were carried out, as follows:

*a*. Tests to prove the sterility of the catgut.

*b*. Tests to show the effect of catgut on growing cultures.

*c*. Tests to show the effect of infected catgut.

In all the experiments, No. 1 iodine catgut was used, and in each case catgut prepared after the von Bergmann method was used as a control.

*a*. Tests to prove the sterility of the catgut.

Pieces of catgut an inch long were placed in various kinds of culture media, and in no instance was a growth observed. To refute the argument that the antiseptic properties of the iodine may have so affected the media as to inhibit the growth of any bacteria present, a large amount—60 c.c.—of bouillon was used for a number of experiments, and no growth obtained. Some of the tests with the von Bergmann gut showed a growth.

*b*. Tests to show the effect of catgut on growing cultures.

In these experiments a relatively large area, upon the plates made with the iodine gut, was free from any growth, as compared with the control plates made with von Bergmann gut.

To disprove the presence of living bacteria in the clear area around the iodine catgut, a piece of agar from this location that had previously been

inoculated with anthrax was placed in the back of a guinea-pig, and the animal survived.

The author believes he is justified in the deduction that iodine gut will, at least in a measure, assist in neutralizing accidental infections of wounds.

*c.* Tests to show the effects of infected catgut.

These tests were made by placing in sterile media pieces of iodine catgut previously soaked for twenty-four hours in cultures of actively growing bacteria. In every case, the iodine gut gave a negative result, while the control Von Bergmann gut gave a positive result in each instance.

Some experiments were made by using pieces of catgut which had lain for some time in an unclean drawer, and no cultures obtained.

The author feels justified in making the statement that iodine catgut is absolutely "uninfectible."

Experiments carried out to test the tensile strength seemed to show that the iodine gut was stronger than the raw gut.

Few experiments were made in reference to its absorbability. Dr. Bookman's experiment, made by placing iodine and von Bergmann gut in artificial gastric juice, showed that the iodine gut was about five times as resistant.

The writer believes that his clinical experience and experimental work justify the following conclusions:

1. The dry iodine catgut is absolutely sterile.
2. It is impossible to infect it by ordinary means.
3. Its imbibition with iodine is not sufficient to act as an irritant upon the tissues.
4. Its tensile strength is superior to raw catgut and to that prepared by the sublimate-alcohol method.
5. It is easily and cheaply prepared.
6. It is absorbed only after it has served the purpose for which it was intended.—*Annals of Surgery*, September, 1905.

CONCERNING THE CAUSES OF GALLSTONES. By Edwin Beer.

The author states the objects of his paper to be: First, to indicate a new method of investigating a very difficult problem, the causation of gallstones, and to show what results the new method of investigation has borne in his hands; second, to interest the members of the society, who are in a position to examine organs derived from a large number of autopsies, in this method of investigation, so that more cases may be brought together and studied, and the correctness of his data be verified or denied.

While admitting that the theory of Naunyn, which holds that the stagnation of bile together with infection and inflammation of the bile-ducts produce gallstones, independent of non-local conditions, has been proven by experiments on animals, yet he questions if a third factor does not play a part in the human subject. As a reason for this question he cites twelve autopsies held by himself, in which an obstruction of the common duct had existed more than four weeks with more or less inflammation of the extra and intrahepatic ducts. In seven cases the obstruction was due to calculi, and in all of the cases stones formed in the liver-ducts. The other five cases presented apparently the same conditions, except the cause of the obstruction was a tumor, and yet no stones formed in the liver-ducts. Hence the question, Does not a third factor enter in the formation of calculi?

Dr. Beer advances the theory that perhaps a faulty hepatic metabolism underlies the formation of gallstones. In closing, he summarizes as follows:

1. Naunyn's factors—stagnation of bile plus inflammation of the bile—passage mucosa—do not seem to be sufficient by themselves to lead to gallstone formation, even though the time allowed for the working of the causes be adequate.
2. My first series of cases shows that these two factors lead to stone formation in patients who previously had gallstones. In this series we have the first real evidence of the factors underlying gallstone production, and the causes of cholelithiasis in human beings.—*The American Journal of Medical Sciences*, September, 1905.

UPON THE RESULTS OF INJURIES TO THE PELVIS DUE TO SHARP INSTRUMENTS. By Kurt Flick.

Stiassny brought together 127 cases of injuries to the pelvis from sharp instruments, and discussed the pathological conditions and the clinical picture. Later, Tillmanns added more observations, and brought the recorded cases to 143. In the surgical clinic at Tübingen there have been four cases in the last thirty years, and these are discussed by Flick. In all these four the bony pelvis was uninjured.

The first instance, which came to notice in 1870, was that of a man, who in stepping from a table upon a chair with such force that the wood entered for four centimeters into the thigh at the juncture with the perineum, tearing out a piece of his trousers. The immediate treatment was by tamponing, and a penetrating injury to the blad-

der was demonstrated. After sixteen weeks of such conservative treatment, the wound healed after an abscess had opened from the rectum, but pus and mucus persisted in the urine. After about nine months the patient was brought to the clinic. A stone was discovered in the bladder, which was removed by operation. The nucleus of this calculus was a piece of cloth which probably was pushed in at the time of the injury. The patient died, and at autopsy there were found, among other things, diphtheritic cystitis and pyelitis, perinephritis, contracted kidneys, a fistula between the perineum and the cavernous portion of the urethra, and gangrenous areas in both lungs. This case is of especial interest because, as a complication of these penetrating injuries, the subsequent formation of a bladder-stone is very rare. Stiassny reports only three such examples in his large series, and these had as nuclei parts of the penetrating instruments. Plattner has described a case similar to Flick's, where a piece of clothing was the starting-point.

The second case was that of a boy, who fell from a tree upon a wooden picket fence, one of the sharp uprights of which entered the body near the anus. A great deal of vomiting followed after some hours, with a tense and tender abdomen. There was no laceration of the rectum demonstrable, but an injury to the peritoneum was assumed from the symptoms. The treatment was expectant with opium and the ice-bag. A steady though slow improvement followed. After ten days, fæces with much mucus was passed out of the wound, proving a lesion to the rectum. Fifteen days after the accident, the wound no longer discharged any fæces, after which the wound gradually healed, and the boy was discharged cured.

The third instance concerned a man who fell from a pile of wood upon the point of a split piece which entered the anal region for about thirty centimeters. Vomiting, anuria, burning in the region of the bladder, great thirst, much hemorrhage from the wound, with occasional masses of fæces and some urine, and bloody urine in the bladder were the phenomena which followed. The diagnosis was perforation of the rectum and laceration of the bladder and of the urethra in the prostatic portion. The bowel movements passed through the wound. A drain was put in, and the bladder was irrigated continuously, and later washed out daily. After about four weeks the fæces came out of the anal opening, and in five weeks part of the urine was discharged out of the natural channel, soon after which he was allowed to leave the hospital.

The last example was furnished by a man who fell ten feet from a hay-wagon upon the blunt end of the handle of a hay-fork which was sticking in the ground. The dull point entered his body in the region of the anus, and as he fell over forward, the handle of the instrument slipped out of the wound. The examination after a few hours revealed laceration of the rectum, a tense and very tender abdomen, and an exudation in the right flank. There was no blood in the urine. Assuming that there was an opening into the abdominal cavity, and perhaps a perforation of the intestines, an immediate laparotomy followed. The intestines were intact, though the visceral peritoneum was injected and lusterless. There was an opening into the peritoneum behind and to the right of the bladder, a double laceration of the rectum, and an opening into the mesosigmoid which led upward along the vertebral column to the height of the second lumbar vertebra. After cleaning the pelvis and removing traces of fæces and bits of cloth, a drain was put out through the wound from the peritoneal cavity, and incisions were made in the flanks and other drains inserted. The original incision was closed in part. Six days later the man died. At autopsy there was found a purulent peritonitis, and the wound along the vertebral column was filled with a foul purulent fluid. In it lay the crushed psoas major, which had been torn loose from its origin, a complication which is very remarkable, as it has never been described before, and which was observed only at the post-mortem. This fourth case teaches, as far as treatment is concerned, the necessity of following the retroperitoneal wound and laying it wide open.

Stiassny has set up a classification of these accidents as follows:

(1) Injury to the superficial covering of the body, to the rectum, and to the vagina, without a lesion of the peritoneum.

(2) Phenomena as in 1, combined with extraperitoneal wounds of the bladder, of the prostate, the urethra, and of the uterus.

(3) Opening of the peritoneum without lesions of the abdominal organs.

(4) Penetration of the peritoneum with lesions of the abdominal organs.—*Beitrage zur Klinischen Chirurgie*, June, 1905, Bd. 46, Heft 1.

# ABSTRACTS OF CURRENT LITERATURE

## DEPARTMENT OF GYNECOLOGY

UNDER THE CHARGE OF

J. CLARENCE WEBSTER, M. D. E. C. DUDLEY, M. D.
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THE INDICATIONS AND CONTRA-INDICATIONS FOR ABDOMINAL DRAINAGE AFTER LAPAROTOMY. By Otto Küstner, Breslau.

Küstner begins by saying that in spite of the fact that drainage is not as necessary or as frequent after laparotomy as formerly, it is still a question much discussed. He refers to Olshausen's article (*Zeit. f. Geb. u. Gyn., Bd.* 48, *H.* 2) as being one of the incentives for his own investigations.

The Mikulicz iodoform gauze drain is described and designated as the one method of special interest for abdominal gynecology to-day. Glass and rubber tubing as drainage, he says, are rarely spoken of or advised in present literature. He then says: "It is an open secret," said Mikulicz, "that since the replacing of antisepsis with asepsis, the operation results, generally speaking, have become no better. Cases of sepsis followed operation in aseptic days as in antiseptic: drainage had been a sort of safety-valve for prevention of the unfortunate death from sepsis, and cases of sepsis still occur. It would be right to conclude that if this 'valve' was formerly applicable, it still is so in those cases in which antiseptic and aseptic protective measures are not sufficient. It is evident that such cases are rare to-day, compared with the pre-antiseptic period. This is the result of more and more rigid anti- and aseptic protective measures during the operation."

Whether these exceptions are to be entirely removed, as Olshausen, among others, strongly advocated, is a question to be considered. We must consider that neither in the time of antisepsis, nor later in the aseptic period, does one operate entirely without contamination by germs; that the operator's hands are occasionally a "germ danger"; that septic infections do occur.

He does not differentiate between benign and malignant cystic tumors, because such a classification was not considered in his earlier work.

He lost seventy ovariotomy cases from the following causes:

1. Secondary hemorrhage from giving way of the ligatures about the spermatic artery, 2 cases.
2. Ileus, 8 cases.
3. Attempted ovariotomy which could not be completed with carcinoma, 7 cases.
4. In cysts with resection and suturing in of the remaining portion, 4 cases.
5. Contracted kidney, 2 cases.
6. Pyelonephritis, 2 cases.
7. Shock in first 24 hours, 12 cases.
8. Peritonitis from previously infected cysts, 6 cases.
9. Sepsis, 27 cases.

Therefore 7.1 per cent mortality.

48 were malignant.

He then explains the action of the Mikulicz drain.

1. It is antiseptic according to the amount of antiseptic material (iodoform) that the gauze contains.

2. The tampon produces a local fibrinous inflammation of the surrounding peritoneum, which after a few days forms a wall shutting off communication with the rest of the peritoneal cavity.

3. The tampon causes all peritoneal organs about it to become fixed by mechanical obstructions at once, and by inflammatory reaction later.

This drain is not suited, he says, for removing large amounts of fluids, as in cases of general peritonitis with large amounts of exudate. This has been already frequently emphasized. One must resort to tubular drainage or to combination of the tubular with gauze.

He finds the indications for abdominal drainage given by Burkhard, Hofmeier, and Fehling as the most worthy of praise, and his attempt at a systematic arrangement of the subject he bases on their findings.

These three writers advise drainage, "*if during the operation an injury has occurred to gut or bladder, whether a previous communication between one or both of these organs and the organ (usually a tube) that has been removed has existed or not.*" The author

agrees with them, and says: "The omission of drainage in such cases is a risk which one dare not oblige the patient to run." In discussing this, he says, "The most frequent are the communications of the left-sided tube-sac with the flexure, or with a part of the descending colon dislocated downwards, more rarely with a displaced small gut, or rarely with the bladder." "Even if the opening can be well closed by Lembert sutures, yet it must be remembered there is no great tendency to a primary union, for the sutures are apt to cut out."

"If a penetrating wound has been made in the bladder or gut, and this has by rapid inflammatory reaction of the neighboring peritoneum been healed, it is to be considered only a fortunate occurrence. The sure way is not to expect, in such cases, a primary healing of bladder or gut. If a Mikulicz drain is placed, and removed only after a week, then a canal is formed by which the contents of intestine or bladder can escape without infecting the peritoneum. This closes surely and quickly by granulation. Very rarely have I been obliged to close such a fistula by operative interference. Fecal matter or urine usually does not escape into the cavity after such a drain is placed. As a rule, a primary healing follows the use of the drain.

"When the bladder or gut has been injured during a laparotomy, in a place where the wall of the organ had not become infected or infiltrated by previous inflammation or by communication with a genital pus-sac, then those rules are followed which those surgeons who do intestinal work have formulated. One can by a careful suture close the opening without drainage, for the wound must heal by primary intention if the necessary technic is followed. Here there is not the danger of giving way of the suture and of secondary infection, as is the case when the edges have been infiltrated or infected. Even here, he says, drainage does no harm, and cannot be considered as an excessive precaution. He does not consider it going too far, either, to drain when the gut-wall has been injured so that only the mucous membrane remains, and when this cannot be well covered by peritoneum, as infectious material and micro-organisms can escape.

In spite of the good results of Zweifel and Ven Baumm, he has considered the drain applicable also to certain cases of complete rupture of the uterus, as the edges of the uterine wound may be considered as infected.

"*Secondly, and of this there can be no doubt, drainage with sterile or disinfecting gauzes is necessary when a pus-collection has been found during a laparotomy which has not been opened for any reason during the operation, and if one wishes to open it secondarily, or there is a possibility that it might open itself secondarily.*" This does not apply to pus-tubes or purulent adnexæ, as they should be removed entire.

"*Thirdly, I consider justifiable the use of the tamponade in parenchymatous hemorrhages which can be checked in no other way, such as occur occasionally after a freeing from adherent tumors or adnexal sacs the posterior layer of the broad ligament and peritoneum of Douglas pouch.*"

A temporary application of a compress until the abdominal wall is almost closed, and then removed, is at times sufficient.

A tampon for hemorrhage left in for 24 or 48 hours, and then removed, does not prove a means of secondary infection. But if this method for stopping bleeding is to be fully without risk, two further conditions must be obtained. First, after removal of the tampon, absolute hemostasis. The abdominal cavity must be completely dry. Second, the tampon must not remain more than 48 hours if one wishes to still close the abdominal cavity. The tampon must be replaced if the first condition is not present, and the cavity allowed to heal by granulation. There is danger of infection from the abdominal wall if the second condition is not fulfilled.

"It is a most important postulate in every abdominal operation, that every hemorrhage, although appearing insignificant, must be checked by the most efficient way before the abdomen is closed."

"Secondary hernia at the point where the tampon is inserted need not be feared, for the wall can be drawn together and a primary union obtained after the 48 hours.

"*If, on the contrary, cystic fluid has escaped into the peritoneum during the operation, then I consider, as Hofmeier does, that drainage is superfluous, and therefore harmful.*"

Large amounts of blood and cystic fluid, he says, can be reduced to the minimum by changing the position of the patient, lowering the pelvis, etc., and mopping it out under liver and spleen, and then the abdomen can be closed. When the fluid is associated with a mass of adherent gut, mesentery, and genitalia, as occurs often after a previous breaking of a pseudo-mucinous cyst, he mops out all fluid possible, and then closes the abdomen.

"If, as is said, drainage is a failure under such conditions, it would be all the more so in a case of acites," because, he says, secretory activity of the peritoneum is increased by the gauze, and because of the later danger of infection.

"*Further, drainage is demanded by Burchard when large wound-spaces are left, because the edges are irregularly cut and are infiltrated and do not approximate, or cannot be drawn together by the sutures.*"

The author has of late given up the use of drainage in such cases, even in the most extensive wound-spaces, and relies upon pressure of the binder, aided, if necessary, by sand-sacks applied during the first days of convalescence. He does not try to close them by numerous sutures, and even if the peritoneum cannot be drawn together, he no longer drains if there is no infection. "The presence of the drain is not followed by any more advantageous adhesions than occur without it, nor is there any more danger of ileus, which is very slight, anyway."

Then, he says, it is not the mere presence of the denudation in itself that causes the adhesions, but the two approximated surfaces must be at rest for a time, or an adhesion will not occur. "*The most effective means of preventing or limiting formation of adhesions after laparatomy is to hinder the physiological movement of the intestine the least. Another effective means is by use of an artificial stimulation of the peristalsis.*"

Opium was formerly used, when there was more danger of implanting micro-organisms, so that a resulting peritonitis should be localized, but the aseptic prophylactic means used now allow the abandonment of the use of opium, and a quieting of the intestines is no more necessary, but it is good practice to stimulate them. After a laparotomy, usually not before the second day is peristalsis evident, and there is reason to fear evil consequences on account of motionless gut if uncovered wound-surfaces or filaments have been left; therefore it is advocated not to await spontaneous awakening of the peristalsis, but to stimulate it by purgatives of one sort or another, or by physostygmin.

The use of the actual cautery to prevent the adherence of the wound surface to the gut, he speaks of and advises. In opposition to Von Franz, he thinks such a burned surface not liable to infection, unless infection is carried in by the unclean parts of the cautery. A method of preventing this he describes.

"*Burchard also said that drainage is necessary when a part of the tumor-wall must be left behind on account of too firm adhesions that cannot be freed, especially from the gut*: The author does not agree with this, except in cases where the part left is infected, or where there is a possible communication with the gut.

As to drainage, when a large amount of pus has contaminated the field of operation and the rest of the abdominal cavity, he says, Burchard, Fehling, Hofmeier, and also Pozzi, have advised it, while Olshausen and others advise against drainage.

"These cases," he goes on, "are to be considered from the same point of view as those where portions of a pus-cavity have been left from necessity, and pus, either free-flowing or infiltrated in the sac-wall is present. Here, if drainage is omitted, there is danger to the patient that could be removed or diminished by drainage." This refers practically to purulent adnexæ. He bases his statements upon more than 500 adnexa operations of this character, in which, since 1897, he has carefully tabulated the bacteriological findings.

He gives a long table of cases, and says that from 5 per cent to 4.6 per cent were drained. He says his figures show that, generally speaking, he is giving up drainage, and he concludes at last that drainage does not give better results. In making these conclusions, he speaks of the difficulty of comparing results obtained at different times and under changing conditions.

A very careful examination of the pus is made at the time of operation (his method, he explains). If the pus is found to be fresh and active, as shown by the character and arrangement and abundance of the micro-organisms, and the presence of fresh well-staining cells and germs, he drains by means of the Mikulicz tampon drain. If the pus is found inactive, old, and containing no microbes, he considers it harmless, and closes the peritoneum. He does not have the confidence that gynecologists especially have, that the peritoneum has a marked power to destroy virulent germs, especially streptococci. Even if no microbes are found, but the leukocytes are numerous and fresh, he does not consider such as harmless, and he drains in all doubtful cases. The kind of organism, whether gonococcus, strepococcus, staphylococcus, or colon bacillus is important. No one would do a radical operation during an acute ascending gonorrhœa. Even if the gonococci appear recent, and also the cells stain well, he closes the peritoneum, and has as yet experienced no evil results.

The other forms of bacteria are treated as before indicated.

"One can never be absolutely sure, for pus that appears inactive and has almost no organisms may be virulent."

Leukocyte counts he formerly had made before operation, but they were found to be of no practical value.

At times he has closed the abdomen even after his laboratory assistant had positive findings as to micro-organisms and pus-cells, basing such action on the history and clinical picture of the case, and has had no bad results by doing so.

He speaks of another factor to be considered, namely, the subjective asepsis of operator, assistants, and also of the abdominal skin, and he emphasizes the impossibility of making hands and

skin germ-free, and says he always uses rubber gloves and rubber covering for the abdomen, with the result that with extreme care and thoroughness in examination of the cases, under his present precautions very rarely does there occur a post-operative sepsis, whereas under the former method of naked hands, etc., now and then a case would occur. Statistics follow, proving his results.

"*When such precautions have been taken, the only source of a post-operative sepsis is from the pus escaping during the operation, and this, as a rule, is harmless.*" If it contains gonococci, even if fresh, they are not dangerous to life; if pus cocci or colon bacilli, they are usually slightly or non-virulent. If a sepsis does occur, he attributes it to some fault in the antibacterial prophylaxis. Covering of the mouth, too, he practices, and says here, too, is a possible source of infection. He concludes, "I believe, therefore, if the principles are carried out according to which I operate upon purulent adnexæ, one can consider, as a rule, the flowing pus as harmless. One can also conclude this is true in many cases in which the pus is examined at the time of operation, and is considered not as wholly harmless. One can also close the abdomen without risk, granted the most accurate antibacterial prophylaxis and a proper amount of operative skill are used, and he must have faultless results. But if an operator cannot trust this view from his clinical experience then can he use drainage in selected cases, and the best method of drainage from above is that of Mikulicz."

The use of nucleinic acid to produce an active leucocytosis is referred to as making harmless the germs that are made more virulent by the opera tion. This procedure is useful in operations upon purulent adnexæ.

"This much can be said to-day: Our observations are suitable to guide the operative treatment of purulent adnexal diseases along very definite paths, which from now on can be followed with greater security than they could have been had not the observations been made. He criticises the vaginal operation, which had its origin in the fact that it should give better drainage, by saying that the utmost conservatism should be practiced in the removal of the pelvic organs, and that only the pus-containing organ should be taken out, and that this cannot be well done by the vaginal route. Hernias can be excluded by the vaginal route, but the danger of them is slight after an abdominal operation.

"*When should fluid pus be drained?*" "I can only say that from year to year I have drained less and less, and in fact so rarely during the later years that I can now say, as a rule, I avoid drainage. In a few cases I have believed that the safety-valve, which, according to our results under certain circumstances, has prevented a general peritoneal infection, should be used. I have used it because I am convinced of its harmlessness if rightly used. In the future I shall possibly employ drainage still more rarely, under guidance of the following principles:

1. The use of the best asepsis.

2. Fresh purulent adnexa cases should not be operated upon by the abdominal route. Three mnoths from the original infection should elapse before an ascending gonococcal adnexa be removed from above—especially so when a mixed infection has not been excluded.

3. The escaping pus should be examined at the time of operation. If the microscopic findings show that it is no longer fresh, then close the abdomen; if the pus is fresh, but is without doubt a pure gonococcal pus, the same is true. For other cases it devolves upon practical judgment and experience to decide."

The whole question of drainage is not as yet a settled one.—*Zietsch. f. Geb. u. Gyn., Bd. LV.*

### Pathology of Thrombosis in the Superior Mesenteric Vein. By Dr. J. Amos.

The pathology of occlusion of the mesenteric vessels has been considered of late on all sides, but the number of closely investigated and reported cases is as yet small. The authors justly emphasize the uncertainty of diagnosis.

The clinical symptoms of an occlusion of the mesentery vessels are so like those of acute intestinal obstruction, that, according to Sprengle, most surgeons make a mistaken diagnosis on account of this similarity. This is easily concluded from the majority of records, and Sprengle admits this with reference to his case, but believes a true diagnosis in his case could have been made if more attention had been given to the exact history.

The diagnosis of arterial embolus has been made with less difficulty than of a thrombosis of a corresponding vein, although the cases diagnosed in the living are relatively few. Both pictures are so alike, that Nothnagel said the differential diagnosis can with great difficulty, if at all, be made. Therefore, by careful examination of the history and exact condition of the patient, we must consider etiological factors. In this way, in several cases, a diagnosis of embolus has been made by knowledge that its cause was present (i.e., vitium cordis), while in other cases if the causes were absent but the same "disease picture" was found, a consideration of a

diagnosis of a venous thrombosis should not be omitted.

A brief clinical picture of venous thrombosis is as follows:

A more or less sudden beginning, or one that is slow in onset, severe colicky abdominal pain, often extending over several days, starting like a "stomach-ache"; often, also, backache, diarrhœa or constipation, and vomiting; accelerated pulse, without corresponding elevation of temperature; abdomen only slightly distended. In some cases one finds strong resistance to pressure and a muffled tympanitic note appreciable over abdomen. Towards the end, almost always a profuse bloody diarrhœa, with collapse—fall in temperature, fluttering pulse, and death.

He considers the question as to whether there are recognizable causal facts leading to a possible diagnosis of thrombosis of the superior mesenteric vein, and bases his conclusions upon two cases of his own and a review of other published cases. In one of his cases an exact diagnosis was made two days before death. Operative interference was hopeless, on account of too far advanced necrosis of the gut.

A detailed description of one of his cases follows, which occurred in January, 1905, in a 32-year-old woman, who, after an eclamptic attack and a five-months' abortion, had severe colicky pains and vomiting. Intestinal obstruction was considered first, but spontaneous bowel movements confused the diagnosis until a tumor developed in the left side of the abdomen, which had a peculiar feel and percussion note; i. e., from a very hard and thick feeling tumor was elicited a strong intestinal resonance. Absence of a quickly arising local meteorism and the too large size of the tumor spoke against diagnosis of volvulus. He emphasizes particularly the peculiar combination of marked resistance and the tympanitic note of the tumor mass as being diagnostic.

He quotes Sprengel as saying, that when the circulation has been disturbed in a loop of intestine, at first there is dilatation from gases, and later the walls are thickened: therefore the early tympany becomes less as the resistance increases, which is in contrast to an invagination.

Further, Sprengel attaches no special importance to the form, position, and consistence of the tumor; for, in a case of invagination at least, the tumor does not present constant findings, but varies in position, form, and consistence.

The author does not agree with Sprengel, but thinks that the tumor and its physical condition give frequently more diagnostic information than one would think from what Sprengel says. The resistance in the abdomen when there is a closure of the mesenteric vessels is more commonly demonstrable than is the case in invagination. The percussion note in the area of resistance gives more frequently with most careful examination and for a longer time a tympanitic resonance.

Pólya described, in two of his cases, exactly this symptom without having considered it of diagnostic value.

"In our case, the history indicating no starting-point for an arterial embolus, but, on the contrary, showed predisposing conditions for formation of a thrombus." Pregnancy, and especially eclampsia, pointed to the proper diagnosis. He speaks of Schmorl's findings that there is a special high predisposition for increased coagulation of the blood in eclampsia—thrombi in the intestinal vessels and once in the portal vein were found. A full autopsy report of this case is appended.

He says: "There is no doubt in my mind that in Schmorl's cases, as well as in my own, that the increased coagulability of the blood was the essential etiological factor in causing the thrombosis." He does not accept Pilliet's view that morbid processes in the gut should be the primary condition. "I would rather be inclined to consider the stagnation in the portal system caused by multiple miliary thrombotic lesions in the liver as responsible for the localization of the thrombus in a peripheral branch."

Two further cases of lying-in women were referred to,—one by Hilton Fagge and one by Kolbing,—the first showing a general tendency to thrombus formation, inasmuch as a thrombosis of the mesentery vein followed a previous thrombosis of a crural vein.

Kolbing's case was one of three cured by operative interference, and occurred during the puerperium. A full report follows: The operation consisted of removing about 50 cm. of the upper jejunum and making a posterior gastroenterostomy.

A description of Kramer's case follows, which Kramer reports as a case of embolus of the superior mesenteric artery. The clinical diagnosis before operation was intra-abdominal hemorrhage with probable peritoneal irritation. He quotes Kramer's remarks about the differential diagnosis between embolus and thrombosis of the superior mesenteric artery and thrombosis of the corresponding intestinal veins. Kramer emphasizes the fact that in the latter he finds a history of a long-standing enteritis and obstinate constipation, and that in a thrombosis of the portal stream an old inflammatory process, such as cirrhosis of the liver, syphilis, or malarial cachexia or marasmus, is to be sought for as a cause.

The author disagrees with Kramer in his diagnosis, but he emphasizes the fact again, that there especially during eclampsia, for thrombus formation, and also that post-mortem examination of a is a special disposition during the puerperium, and clinically diagnosed lung embolus usually shows a thrombosis of the vessels.

There were no preliminary row of symptoms pointing to a formation of an embolus in Kramer's case. There was too much acetic fluid in too short a time for an embolus,—much more apt to be the case in thrombosis. In embolus of the artery there is, almost without exception, limited quantities of fluid, while in thrombosis there is almost always a large amount of fluid.

As to the location of the thrombosis, he says it varies,—can be primarily in the superior mesenteric vein, or this vessel can be involved by extension of a primary thrombus of the portal vein.

Six cases are quoted from the literature in which, by apposition to a thrombus of the portal vein, one had formed in the superior mesenteric artery with infarction of the corresponding section of the intestine. They are cases of Kendal Franks, Frankenhauser, Sachs, Sprengel, Pólya, and Grawitz. He then says:

"But previous thrombosis of the portal vein is not necessary. The primary thrombosis can occur in the peripheral vessels if there is a previous damming back in the portal stream. We see this, in some cases, in the superior mesenteric vein, alone, or at the same time with the splenic vein; in other cases, by disintegration and retrograde emboli from thrombi of the obstructed splenic veins. Of such cases, two reported by Dreyfuss are quoted, and one by Koster.

One case, occurring in the author's clinic, in which there occurred, together with a cirrhosis, a thrombosis in the peripheral veins of the portal system, is reported in full. In this case he considers the primary cause was a syphilitic tumor of the spleen, from which, by apposition, occurred the occlusion of the mesenteric vein. Then he says: "After we have seen that about one fourth of all cases occur in puerperium and a number more with an attendant disturbance of the portal system, yet there remains a number for which other causes lie at the bottom, the explanation of which an autopsy does not always afford." He mentions as illustrations: cases following appendicial inflammations (Pólya): entercolitis in one case, mesenteric thrombosis after typhoid in a second case (Koster); enteritis (Eisenlohr); inflammatory diseases of the intima in veins themselves (Pilliet); following a gastroenterostomy for pyloric obstruction (Maylords); etc., etc.

In some of these cases there may be some intimate connection between the disease and the preceding operation. In a few the etiology is wholly in the dark, and there remains only the supposition of an accidental localization of a marantic thrombosis following an exhausting disease or operation. "Therefore I have come to the conclusion, from the facts known at the present time, that there is no special etiological factor like a specific infection of the intestine for thrombosis of the mesenteric veins. When there are symptoms present like those of an ileus, one should always think of this disease if—(1) there are present conditions favoring an increased coagulation of the blood (earlier thrombosis in other places, or puerperium, or eclampsia); (2) there is stagnation in the portal circulation; (3) there has been any artificial thrombus formation (operation) in the vicinity of the affected vessels; (4) there are purulent processes in the "Pfortaderwurzelgebiet."

Differential diagnosis from other forms of ileus can be considered on condition there is present a resistant tumor, giving intestinal resonance. Early appearance of a demonstrable amount of ascites speaks for a diagnosis of venous occlusion.—*Zeitsch. f. Geb. u. Gyn., Bd. LV.*

THE RESULTS OF OVARIOTOMY IN TWENTY-TWO YEARS' PRACTICE. By Heinrich Fritch, Bonn.

Fritsch has performed 989 ovariotomies in 22 years. He speaks of the infrequent occurrence of large ovarian cysts to-day as compared with his first ten years of work. Of all his operating, myomectomy is most frequent. Then follow operations for cancer of the uterus, and then for ovarian tumors. "In fact, within a year I have removed more pregnant tubes than ovarian cysts." He speaks of the uncertainty of statistics, the errors arising from comparing work of different operators, of private with clinical work, of assistants with the older men who perform the more difficult operations, and then says: "In spite of these errors in statistics, it would be well if an operator, at the end of his active work, look back critically over a large number of operations and show by these that even if contra-indications of ovariotomy are restricted as much as possible, yet the results are not as good as one might expect or as one possibly really believes."

He has only had two cases of death from narcosis from any cause. He has always seen favorable anæsthesia in all of a large number of cases in which there was a heart lesion.

His statistics are as follows:

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|---|---|
| Benign papilloma | 1 |
| Suppurating hematoma | 2 |
| Fibroma | 6 |
| Hematuria | 12 |
| Sarcoma-endothelioma-teratoma | 14 |
| Superficial papilloma with ascites | 18 |
| Solid carcinoma | 49 |
| Parovarian cysts | 52 |
| Dermoids | 89 |
| Bilateral cysts | 192 |
| Single cysts | 554 |

—*Zeitsch. f. Geb. u. Gyn., Bd. LV.*

### Clinical Notes of a Conservative Series of Cases of Eclampsia. Jardine, R.

In 18 months he had 15 cases, the greater part of which he treated expectantly. His procedure is to give saline intravenous injections; he adds a drachm of sodium acetate to the pint of decinormal saline solution, injecting one or two pints. He usually bleeds his patients—at first only those who were plethoric were subjected to the abstraction of blood; latterly he bleeds nearly every case. The blood is allowed to run until the pulse is distinctly affected, removing 12–20 ounces. There is no danger in the procedure if the blood is replaced by salt solution. He believes delivery is not indicated unless the general measures do not control the convulsions, so now rarely uses rapid dilatation of the os; forceps or version are reserved for the cases where the os has dilated spontaneously. He employs chloral and bromide of soda if the patient is restless, but holds that the hot pack is much better. He considers that morphia is not indicated. His conclusion is that the conservative treatment is as effective as the operative, and has not the danger of the cervical tears.—*Journal of Obstetrics and Gynecology of the British Empire*, Vol. VIII, No. 1, July, 1905.

# ABSTRACTS OF CURRENT LITERATURE

## DEPARTMENT OF OBSTETRICS

UNDER THE CHARGE OF

C. S. Bacon, M. D. Rudolph W. Holmes, M. D.

C. v. Bachellé, M. D.

### Fracture of the Clavicle in Head-Presentations. By E. Hauch.

It is a well-known fact that fracture of the clavicle during breech presentations occurs frequently as a result of the necessary manipulation for freeing the arms, and it is also a fact that this occurs also in head presentations. Dr. Muus, of the Royal Maternity Hospital, of Copenhagen, first called attention to this, and believed it to occur during the passage of the shoulders through the pelvis, and not because of the manipulations used to deliver the shoulders over the perineum.

Muus' statistics showed that fractures occurred in 1.3 per cent in 1600 cases. Of the 22 mothers whose children sustained this injury, 9 were primiparæ, 13 multiparæ. The anterior clavicle was fractured five times as frequently as the posterior clavicle. During this period it was the practice to seize the child's neck and make traction alternately, first anteriorly and then posteriorly, in the meanwhile protecting the perineum with the other hand. Believing that this method favored the production of the fracture, it was abandoned and the delivery assisted by moderate pressure on the fundus of the uterus, the perineum being protected as before.

The results obtained are indicated by Hauch's statistics, showing that the injury occurred in only 0.67 per cent of cases (2,531). Eight mothers were primiparæ, 8 were multiparæ; the anterior clavicle fracturing in 13 cases and the posterior in 2 cases. These results show that the fractures were largely due to the technic in delivering the shoulders.

The method of protecting the perineum which was not changed may be a factor in the causation of the injury, since it crowds the anterior shoulder against the symphysis.

The fracture appears more frequently in the case of multiparæ than in primiparæ, and the cause of this is obscure, unless it be that the latter part of the labor is much more rapid in multiparæ than in primiparæ. Muus thought the fracture occurred within the pelvis; but if this were the case, the accident ought to be more frequent in primiparæ, whose more rigid perineum calls for more manual assistance in delivery. If it did occur within the pelvis, it should be seen most frequently in contracted pelves, but in 145 cases the injury occurred in only 2, or in 1.4 per cent of cases.

The child's shoulders enter the pelvis in either the diagonal or transverse diameters, which are between 12.75 and 13.5 cm. in length, while the distance from the promontory of the sacrum to the symphysis and the distance between the ischial tuberosities is about 11 cm. in each case. This makes it more probable that the fracture occurs during the passage of the shoulder under the symphysis. The diameter of the shoulders is rather difficult to estimate, because during labor they are carried anteriorly on the child's breast, thereby decreasing the breadth by 4–5 cm.

The fracture occurs most frequently between the anterior and middle thirds of the clavicle, or near the acromion, and not about the middle, as Riether stated. The mechanism of the injury is as follows: During labor, if the anterior shoulder is driven up against the symphysis, the uterine contractions, acting from behind, cause a transverse strain to come upon the clavicle, leading to the production of the fracture. Hauch made a series of experiments to determine the force required to fracture the clavicle and found in four cases only 5–8 kilograms were necessary; in 2 others, 15–16 kilograms were necessary. The injury occurred only when the shoulders were bent forward on the chest, and then rather easily. The perineal muscles may possibly exert this minimum of force (5 kilograms), and the pressure of the hand supporting the perineum can certainly.

In each case the fracture occurred mesial to the coraco-clavicular ligament, the angle of the fracture pointing upward. Most of these were subperios-

teal, adding to the difficulty of the diagnosis. Of his 16 cases, 13 had healed in 10 days with callus formation, 1 was not quite solid, 1 had movable fragments, and 1 had healed with deformity upward.

In conclusion, he states that some of these fractures are due to traction on the head in delivery of the shoulders; others occur during the passage of the shoulders under the symphysis when no traction is exerted, and that in these cases the pressure of the hand protecting the perineum plays an important role in the production of the injury. The prognosis as to healing is good.—*Zentralblatt für Gynäkologie, No.* 33, 1905.

CARCINOMA OF THE RECTUM IN PREGNANCY. By G. C. Nijhoff.

G. C. Nijhoff reports a case of carcinoma of the rectum during pregnancy, and reviews 26 cases in the literature. His case occurred in an 18-year-old primipara, in whom labor began at about 7½ months. The child was delivered with forceps, and survived; the mother died the day after delivery. Of the cases reviewed, 15 out of 20 were 35 years of age or under, 5 were primipara.

The 26 cases he divides into 3 groups:

1. Those in which carcinoma is discovered after the delivery.

2. Those in which an inoperable carcinoma is discovered as an obstacle to delivery at the time of labor or just before.

3. Those in which an operable carcinoma is found during pregnancy.

Cases such as are included in the first group should not occur, since a careful examination by a competent obstetrician should reveal the existence of the cancer. However, cases do occasionally occur in which the existence of the growth is discovered only in the puerperium or later, but if tenesmus or bloody stools appear during pregnancy, they should be regarded as an indication, and a careful vaginal and rectal examination should be made.

In most of the cases of the second group, carcinoma constitutes a great obstacle to delivery, and only a premature and illy developed child can be born spontaneously; and when such a tumor exists, the child only should be considered, and no operation should be attempted which jeopardizes its life. The normal end of pregnancy should be awaited, and in case of a dead child, embryotomy, in case of a living child, Cæsarean section is indicated. If the mother should die, post-mortem section should be made. In the living mother, the incision should be made as far away as possible from the diseased portion; i.e., either on the anterior side of the uterus or transversely over the fundus. The Porro operation is the choice only when the uterus is infected, and then the stump should be treated extraperitoneally.

If an operable carcinoma of the rectum be discovered during pregnancy, the indications are best met by a prompt excision of the growth, though, according to the cases cited, a better prognosis seems to exist when the pregnancy is first interrupted and the excision done a little later.

In case the child is not viable, the choice must be between delay until viability is established and immediate interference. He feels convinced, however, that the danger of the operable tumor becoming inoperable during this delay is too great to take the chance—and that a slim one—of saving the child.—*Zentralblatt für Gynäkologie, No.* 28.

SPONTANEOUS RUPTURE OF UTERINE SCAR. By Dr. Schink.

The fact that scars in the uterus have a predisposition to rupture during pregnancy or labor has repeatedly been observed in recent literature. Such scars are especially those in the supravaginal portion of the cervix, as the result of the deep incision of Dührssen or vaginal Cæsarean section. Such ruptures are probably best explained by the thinning which that portion of the uterus undergoes during the latter part of pregnancy and during labor, but it is a fact that rupture of scars in the fundus and body of the uterus may occur, notwithstanding careful suturing after Cæsarean section. Until recently, such cases have been reported as following the longitudinal uterine incision only, but of late the transverse fundal incision has come in for criticism on this score, although only in a very few cases. Only three reported cases were found in the literature, and to them is added one occurring under Schink's observation. The patient was a III-para with flattened pelvis, diagonal conjugate diameter being 8½ cm. The patient showed the usual signs of internal hemorrhage; besides this, the abdomen was distended and very tender. Uterus was not to be outlined, but fetal parts were distinctly and easily palpable under the abdominal wall. At the laparotomy, he freshened the edges of the uterine wound and sutured it in tiers. The patient made good recovery. The child was dead.

The placenta was not seated over the scar and could have had nothing to do with the softening and thinning of the uterine musculature at this point. The tear extended exactly from the insertion of one Fallopian tube to that of the other, fol-

lowing the line of the previous incision. In this case he believed he could repair the tear with less shock to the patient than to have done a hysterectomy or a supravaginal amputation. From this it would seem that in the conservative Cæsarean section, it matters little whether the incision be longitudinal or transverse, for the predisposition to rupture in a new pregnancy exists in either case. —*Zentralblatt für Gynäkologie, No.* 32.

### Etiology of Diagonal and Transverse Presentations. By F. Kermauner.

Transverse presentation at term in primiparæ are seldom met with, the incidence being between 1 and 5 and 1 and 13, as given by different authors. The etiologic factors mentioned are hindrances to engagement of the head; as, contracted pelves, tumors, and occasionally placenta previa; in addition to these, malformations of the uterus, the author himself having had a case of uterus bicornis in which the first and fourth pregnancies resulted in transverse presentations, while the other two pregnancies aborted. He reports another case with moderate pelvic contraction, conjugate diagonal 11.5 cm., in which the head would not engage and remained in the left iliac fossa, the uterus being in extreme dextroversion and torsion as indication by palpation of the round ligaments. The internal examination showed the cavity of the pelvis filled with a tense fluctuating cyst; the cervix being displaced upward, backward, and to the left. The cyst proved to be the bladder, the catheter withdrawing 900 c.c. of clear urine. The tumor disappeared, the cervix returned to the middle of the pelvis, and the head presented at the inlet. Within two hours the head was again found up in the iliac fossa, and after repeated attempts, the woman spontaneously passed 300 c.c. of urine. After that the head entered the pelvis and labor proceeded. After delivery there was nothing unusual in the behavior of the urinary secretion. In this case, no doubt the pelvic contraction made it easier for the diagonal presentation to occur. No anomaly of the uterus was present, and the overfilled urinary bladder could only have been the cause of the persistent malpresentation.

This position of the bladder at the time of labor is quite atypical, for at that time it is usually an abdominal organ. Its position in the pelvis could be explained by the fact of a pre-existing cystocele being present, as has been observed by Ohlshausen. In this case, however, no sign of cystocele existed. Perhaps the cervix was not firmly attached to the bladder, as is usual, or perhaps the site of the attachment was abnormally high on the bladder, so that as the uterus rose out of the pelvis it did not draw the bladder up with it, or there may have been abnormal adhesions to the inlet of the pelvis. Another interesting fact is, that, two days after delivery, the bladder, distended with 500 c.c. of urine, was not palpable above the pelvic brim.—*Zentralblatt für Gynäkologie, No.* 34.

### Historical Investigation Concerning the Secretory Activity of the Amniotic Epithelium. By L. Mandl.

Mandl concludes from a histologic study of the amnion in the guinea-pig, rabbit, dog, cat, and human that we are justified in ascribing a secretory function to it. The basis of his study were specimens obtained by operating at different periods of gestation. The human specimens were obtained from three cases of Cæsarean section—thus excluding the changes, usually regarded as evidences of senility and cessation of function, or possibly as traumatic, found in specimens spontaneously expelled. His conclusions are based upon morphologic changes in the amniotic epithelium, which he regards as analogous to those found in the epithelium of the kidney, adrenal, and other organs known to be actively secretory. He was able to demonstrate fat droplets, evidently in the process of formation, escaping from the free border of the cells. The behavior of the nuclei and the staining reactions of the cell protoplasm resembled that seen in secreting epithelium elsewhere.

All this gives us a new view point, he says, from which to study the question of the origin, chemical composition, and biologic properties of the liquor amnii.—*Zeitschrift für Geb. und Gyn.*, Vol. LIV, Part 3, 1905.